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PLANNING GUIDELINES FOR THE CALIFORNIA DESERT PROGRAM

PREPARED FOR

BUREAU OF LAND MANAGEMENT

JANUARY 1971

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PLANNING GUIDELINES FOR THE CALIFORNIA DESERT PROGRAM

Prepared for

BUREAU OF LAND MANAGEMENT

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CORPORATION
455 CAPITOL MALL
SACRAMENTO, CALIFORNIA 95814

(916) 444-6540
CABLE: "DESOURCE SACRAMENTO CALIF"

DAVID E. LILIENTHAL
PRESIDENT AND CHAIRMAN

January 29, 1971

Mr. J. Russell Penny
State Director
Bureau of Land Management
Federal Building
2800 Cottage Way
Sacramento, California 95825

Dear Mr. Penny:

We are pleased to submit to the Bureau of Land Management this report entitled "Planning Guidelines for the California Desert Program" pursuant to Contract Number 53500-CTI-56 (N) of August 28, 1970.

Development and Resources Corporation fully endorses your concern for the exigent need for protection of the California desert environment. The uncontrolled uses of the desert are causing irreparable damages to its resources. Thus it is imperative that a comprehensive plan for desert management be immediately formulated. We believe this report will provide the planning guidelines necessary for the development of such a plan.

The report was prepared under the overall direction of Mr. Harald Frederiksen as Program Manager and me as Study Leader. Assistance was provided by Mr. Darryl Davis and special consultation by Mr. William E. Warne. We acknowledge the important contributions by you and your staff which were essential to this report. Special recognition is given to Dr. Dillard H. Gates of your staff who made extensive contributions to the investigation and the preparation of this report.

We hope our report will provide the basis for the development of a comprehensive plan for management of the California desert.

Sincerely,

Tuck Kamine

Tuck Kamine
Deputy Director for Engineering

Enclosures

CORPORATE HEADQUARTERS: ONE WHITEHALL STREET
NEW YORK, N. Y. 10004
(212) 944-4521

1632 K STREET, N.W.
WASHINGTON, D.C. 20006
(202) 737-6530

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Technical supplements prepared by the Bureau of Land Management are included in a separate appendix to this report.

INTRODUCTION

The California Desert - A Critical Environmental Challenge, published in January 1970 by the California State Office of the Bureau of Land Management sets forth the problems of use and management of the California desert. This report points out the unique character of the California desert. The California Desert is the only desert in the world with such a vast array of desirable characteristics and it is adjacent to a large population with the affluence, mobility, leisure time and desire to make use of it. The degradation of the desert environment resulting from carelessness and overuse is emphasized and steps that must be taken to reverse the present trends and to enhance and restore environmental quality are presented. In addition, Technical Supplements, published October 1969, gives the status of current information concerning desert resources and their uses. The two documents together provide the basis for a program of action that will result in plans for wise future management of the California desert.

Figure 1 shows the boundaries of the California desert as envisaged in this report. There are over 12 million acres of public domain included within these boundaries. This represents an increase in size over the area set forth in The California Desert report. The increase is a result of incorporating additional lands with desert characteristics within the Bakersfield district and along the Colorado River. These areas were added to the California Desert Program to reflect common desert characteristics, to meet projected demands on desert resources and to add to overall efficiency of resource inventory and analysis techniques.

The California Desert states that, "It must be the goal of the Bureau of Land Management to meet the major predicted needs of the 1980's for the California desert and its resources with full understanding of, regard for, and protection of its environmental values. The accelerating increase in demands for the use of the desert will require a major program of investment and management. If this goal is to be met, two vital steps must be taken in the immediate future." These steps are identified as (1) data collection and comprehensive planning and (2) immediate critical management action.

This report endorses and supports the concept presented in The California Desert. In addition it provides a mechanism and suggests a planning process consistent with the Bureau Planning System for achieving management goals defined in this document. This report consists of deliberately planned segments, each contributing directly to development and implementation of a California Desert Plan, which will provide the information base for and will culminate in a plan for management, development, and use of the desert

ecosystem. The planning effort also will recognize the critical need for interim management to protect irreplaceable desert resources now in danger of destruction and will propose programs to accomplish this end concurrently with preparation of the Desert Plan.

In early years of the California desert, natural resources were exploited primarily for economic gain. The mineral wealth of the desert was and continues to be a major source of revenue. Livestock grazing on a limited scale, where conditions permit, also contributed to the local and state economy. In other cases, the California desert served more as a barrier or obstacle to be overcome than an asset. However, in many instances it has been subdued, if not overcome, and is now criss-crossed with roads and trails and rights-of-way for highways, powerlines, pipeline and aqueducts. Successful users of desert resources have modified its often harsh environment but in turn have been modified by it.

In addition to economic and commercial uses, in recent years the California desert has been increasingly exposed to a multitude of other uses which are best classed as recreational and aesthetic. It is these uses that are changing the face of the desert even more rapidly than commercial uses. The fragile desert ecosystem is being subjected to a new set of uses that place additional stress on a delicately balanced environment.

During summer months the desert environment is harsh or even hostile to the human visitor. But during other seasons, people from the affluent, mobile society of the congested, smog-filled, Los Angeles basin "flow" out onto the desert to relax, to recreate, to breathe the clean air, and to "recharge" themselves for another assault on the asphalt jungle in which they live and work.

The myriad of uses to which the desert is being subjected is causing and will continue to cause ecological, economic, and social changes and conflicts. If the desert ecosystem is to survive, the long-run uses must be compatible with the ecology of the desert. In addition, goods and values supplied by desert resources must be evaluated in both economic and social terms in order to determine the contribution of each use or combination of uses and thus provide a mechanism for resolving land-use conflicts. A full evaluation of desert resources will include ecological, sociological, and economic considerations. Proper allocations of land use or resolution of land-use conflicts will depend in part upon the appropriate blend of these three considerations in terms of the objectives to be achieved in order to reach goals set by society.

The fact that the California desert received over five million recreational visitor-days of use in 1968 is an expression of its great social impact. The projection that, with development, it will be subjected to an excess of 50 million visitor-days of use by the year 2000 is an indication of its increasing social and economic significance. This social impact (extra-market value) must be studied, evaluated, and insofar as possible, quantified and measured.

Extra-market values of aesthetics and recreational use of the California desert are very real but difficult to measure. Values for these activities have not been established in the marketplace. Despite this fact, it is obvious that extra-market values exist and these values are increasing as more people use the desert and as desert resources are diminishing or being degraded by uncontrolled use.

Controlling the use and protection of desert resources involves land-use allocations that hopefully will be based on rational choice. Rational choice can be made only following full consideration of both market and extra-market values of all resources under consideration. Certainly in some cases conflicts will arise between what can be termed preservation values and development values. Land-use allocations, properly made, will take into consideration the preservation values lost if the decision is to develop or the development values foregone if the decision is to preserve. Development, as used here, does not necessarily mean buildings or other structures but includes uses of the desert that damage or destroy desirable wildland or natural characteristics.

The concern for natural beauty, outdoor recreation and environmental quality expressed in California and throughout the nation is clear evidence that the public is willing to pay for extra-market values of preservation or conservation of desert and other resources. Economists and other social scientists must become part of resource planning and management teams if all values are to be properly evaluated.

Segments making up the planning document for the California Desert Plan are (1) concept, (2) outline, (3) staff organization and structure, (4) activities schedule and planning network, (5) interim critical management needs, and (6) budget estimates. Each segment is discussed in detail to show its interrelationship with other segments and to insure clarity and continuity throughout the report.

In addition to the segments of the planning document enumerated above, this report includes, as appendices, supplemental statements furnished by BLM staff. These statements consist of (1) ADP Support Program (Appendix A), (2) Pilot Resource Inventory Report (Appendix B), (3) Way-Station Report (Appendix C) and (4) Protection Report (Appendix D).

SCOPE OF REPORT

This report, submitted to the BLM California State Director on January 29, 1971, makes reference to and discusses in some detail all recognized essential elements of the California Desert Plan.

Budgets and staffing schedules were prepared and activities discussed to reflect two levels of effort: (1) Optimized Plan Development Program, and (2) Extended Plan Development Program. The optimized plan portrays the job to be done and is consistent with the staffing and schedule of activities to accomplish the job efficiently and within a time period reflecting the urgency of problems of the California desert. The extended plan would accomplish the same job with a smaller staff but over a longer period of time. It is presented as an alternative to the optimized plan, recognizing that continued inaction contributes to further damages or losses of irreplaceable resources of the desert environment.

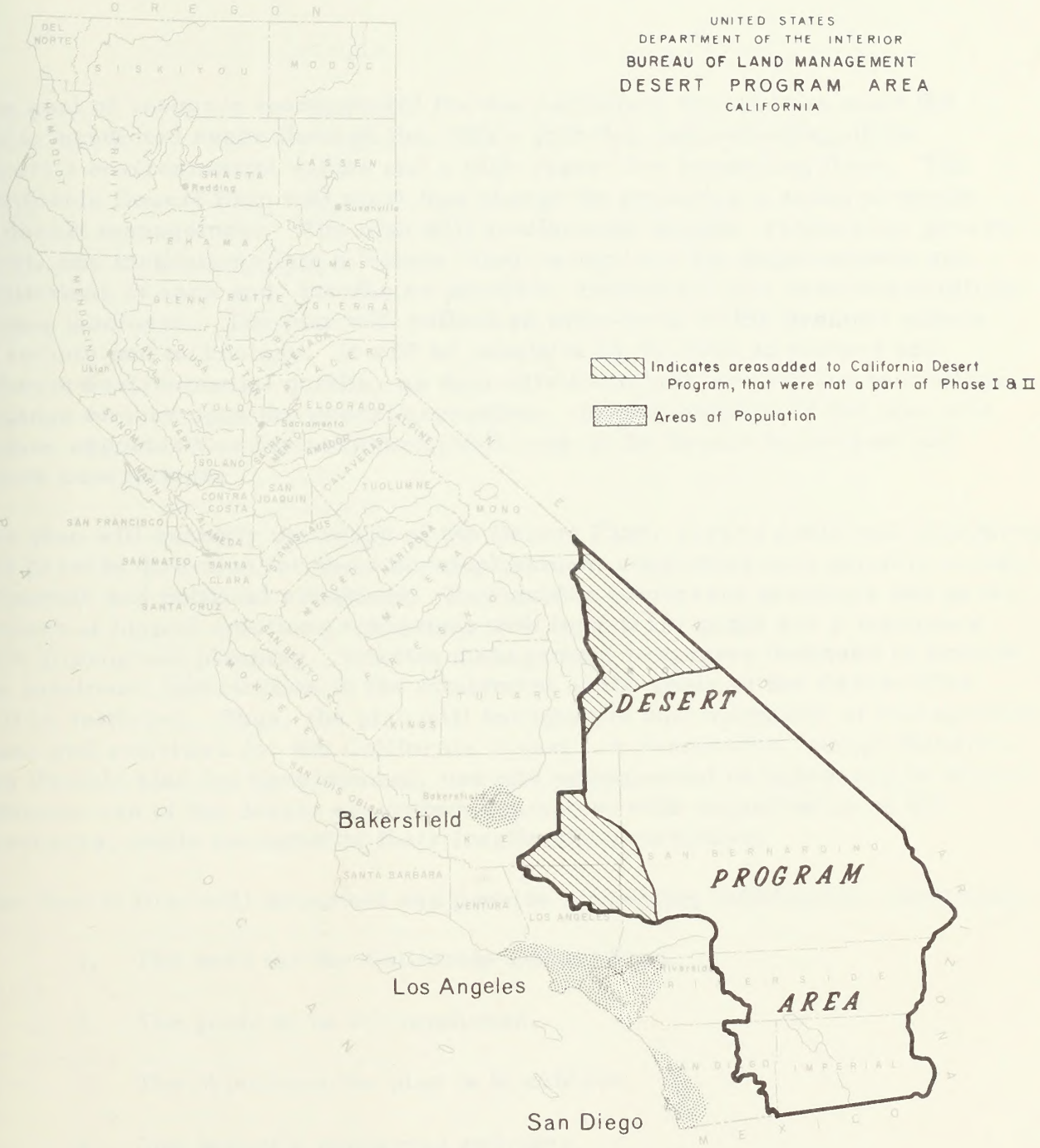

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
DESERT PROGRAM AREA
CALIFORNIA
Indicates areasadded to California Desert Program, that were not a part of Phase I & II
Areas of Population
DESERT
PROGRAM
AREA
Bakersfield
Los Angeles
San Diego
OREGON
DEL NORTE
SISKIYOU
MODOC
HUMBOLDT
TRINITY
SHASTA
Redding
LASSEN
Susanville
TEHAMA
PLUMAS
GLENN
BUTTE
SIERRA
MENDOCINO
Ukiah
LAKE
COLUSA
SUTTER
NEVADA
PLACER
YOLO
EL DORADO
Sacramento
ALPINE
SONOMA
NAPA
SOLANO
AMADOR
CALAVERAS
YUBA
SAN FRANCISCO
CONTRA COSTA
SAN JOAQUIN
TUOLUMNE
MONO
ALAMEDA
STANISLAUS
MERCED
MARIPOSA
SAN MATEO
SANTA CLARA
SANTA CRUZ
SAN BENITO
MONTEREY
TULARE
KINGS
SANTA BARBARA
VENTURA
SAN BERNARDINO
RIVERSIDE
IMPERIAL
MEXICO

Figure 1

CHAPTER I

CALIFORNIA DESERT PLAN CONCEPT

The goal of resource management for the California desert is to meet the major predicted needs through the 1980's with full understanding of the desert's environmental values and a high regard for protecting them. The California Desert Plan will meet this charge by providing a sound program of desert management. The plan will amalgamate people, resources, government, and institutions into a "whole" that recognizes the requirements and limitations of each and, insofar as possible, minimizes and resolves conflicts among land uses. The plan will reflect an awareness of the dynamic nature of society and technology. It will be sensitive to the need to protect and enhance environmental quality, as spin-offs from both society and technology impinge further upon the desert ecosystem. Implementation of the plan will assure opportunities for continued public use of the desert by present and future generations.

The plan will quantify the scope of the Desert Plan, record goals and objectives and provide direction for their accomplishment consistent with existing social, economic and political situations. Recognition of current problems and development of logical solutions consistent with long-term goals are a legitimate part of program planning. Interim management programs designed to provide the maximum contribution to the attainment of the goals of the Desert Plan will be initiated. Thus, the plan will become the documentation of management plans and activities for the California desert. A responsive, comprehensive, and flexible plan for development, use and management is necessary to assure optimum use of the desert ecosystem consistent with conservation of the resources, while recognizing their fragile characteristics.

The Desert Plan will document and provide supporting information concerning:

1. The need for the California Desert Plan.

2. The goals to be accomplished.

3. The objectives the plan is to achieve.

4. The desert's resources and uses.

5. The allocation of desert resources among present and potential users and criteria to serve as the basis for resource allocation.

6. The interrelationships of various levels of government, agencies, institutions, and individuals as they pertain to the desert.

7. The activities and time sequence necessary to meet objectives of the plan.

8. The information base necessary to implement the plan.

9. The means for management to accomplish its objectives, including coordination of all recognized activities.

10. The value to society of managing the desert according to plan.

11. The development of a program of continuing research and study.

The Desert Plan will be developed utilizing the following premises as guidelines.

1. Use of the desert is increasing at an accelerating rate. Much of the present use of the desert is uncontrolled and destructive of fragile desert resources. To assure continued availability of desirable desert characteristics for present and future generations, a comprehensive plan of development, use, and management is imperative.

2. The BLM has the authority and responsibility for managing that part of the desert ecosystem included within the public domain to:

   a. Provide for the public welfare and well-being.

   b. Enhance and improve environmental quality.

   c. Meet local, state and national goals of social and economic development.

3. Components of the plan must be implemented immediately, prior to the completion of studies.

4. The plan must encompass all of the 24 million acres within the California desert area, 12 million acres of which is included in the public domain.

5. Maximum usefulness of the plan can be achieved only through user and public involvement in all phases of the plan's development and implementation (plan with the people, not for the people).

6. The Desert Plan will be fully coordinated with planning units of other governmental subdivisions whose planning functions interface with those of the BLM.

7. The plan will be comprehensive but will provide sufficient flexibility to allow for modifications as new and pertinent information becomes available. Periodic revisions of the plan will be necessary.

DISCUSSION OF THE CONCEPT*

The goal of resource management for the California desert is to meet the major predicted needs through the 1980's with full understanding of the desert's environmental values and a high regard for protecting them. The California Desert Plan will meet this charge by providing a sound program of desert management.

This concept presents a broad goal of resource management and proposes a time frame consistent with realistic planning projections for the California desert. Use of the desert ecosystem is increasing at an accelerating rate. Recognition of the effects of increasing uses is imperative now if effective planning is to result, but precise planning involves the interaction of change and time. Thus, very long-range planning projections are of limited value for the complex and dynamic desert ecosystems. Projections of 20 years will about reach the limit of utility for the present.

The program of desert management will reflect the plan. The requirement for practical management will incorporate into the plan the factors of environmental values, changing needs and time.

The plan will amalgamate people, resources, government, and institutions into a "whole" that recognizes the requirements and limitations of each and, insofar as possible, minimizes and resolves conflicts among land uses.

The plan will portray individual and institutional human desires in terms of their impact on desert resources. It will show that attainment of some human desires is limited by the physical and/or biological characteristics of segments of the desert ecosystem. A program to recognize the limitations of resources and to resolve conflicts in instances where incompatible uses of desert resources are proposed will be a vital function of the planning. For successful implementation of the plan, it will be necessary to accept the idea that both people and resources contribute to the "whole" of the desert ecosystem that must be managed.

*Underlined statements constitute the core elements of the concept.

The plan will reflect an awareness of the dynamic nature of society and technology. It will be sensitive to the need to protect and enhance environmental quality, as spin-offs from both society and technology impinge further upon the desert ecosystem. Implementation of the plan will assure opportunities for continued public use of the desert by present and future generations.

Changes in society will be reflected in changing uses of desert resources. The plan must have sufficient flexibility to accommodate future uses of the desert that may not be envisioned in the initial planning process. The plan will recognize that changes in society and technology that impact the desert may be either good or bad both for people and for the desert. Thus, of necessity, the desert plan must present means for evaluating changes, problems, alternatives and programs that continue to enhance and protect the environmental quality of the California desert. The plan may point to the need for some restraints, and it may reveal even more clearly that continued unplanned use will apply the ultimate restraint of rendering the desert useless in the future. It will provide the basis for acceptable, sound programs for management.

The plan will quantify the scope of the Desert Plan, record goals and objectives and provide direction for their accomplishment consistent with existing social, economic and political situations.

The bounds or limits of the Desert Plan are set. Elements of the Desert Plan will be identified, evaluated and discussed. National, regional and state goals, as they relate to the Desert Plan, will be presented and discussed. Where goals have not been specified, they will be set forth. The fundamental belief in goal orientation is that planning for California desert resource utilization must be guided by the desire to achieve specific public goals. Goal establishment represents the highest order of public achievement. It serves as the best guide to the interests of the people using the desert in determining desert resource allocation and priorities for land use decisions.

Recognition of current problems and development of logical solutions consistent with long-term goals are a legitimate part of program planning. Interim management programs designed to provide the maximum contribution to the attainment of the goals of the Desert Plan will be initiated. Thus, the plan will become the documentation of management plans and activities for the California desert.

The needs and responsibilities for desert ecosystem management continue concurrently with plan development. Problems concerning desert resource misuse, degradation, and destruction have been identified, though their extent needs further study. Solutions to problems where they are starkly

apparent cannot await development of plans for management of the entire California desert. Without immediate action programs, some fragile and irreplaceable resources, including rare and endangered plant and animal species, will be lost forever. Future generations will be deprived of a part of the heritage that is rightfully theirs. Action programs designed to reverse destructive trends and to protect and preserve rare and endangered species are a part of the Desert Plan. These programs are structured so as to become a part of and to strengthen the overall Desert Plan. Thus, some phases of implementation become an inseparable part of the plan.

A responsive, comprehensive, and flexible plan for development, use and management is necessary to assure optimum use of the desert ecosystem consistent with conservation of the resources, while recognizing their fragile characteristics.

The California Desert Plan will include all activities pertinent of the management of the desert ecosystem. It will be organized to be responsive to changing conditions. As a management program, the plan will inventory resources and uses, make land-use allocations and define physical works. It will define programs. It will provide the means of management as well as performing the planning function itself.

The Desert Plan will document and provide supporting information concerning:

1. The need for the California Desert Plan.

   The statement of the plan will address itself to the current situation of the California desert. It will quantify and discuss desert resources and the uses now being made of them. It will appraise the response of desert resources to current uses, set forth the characteristics of present desert users, and predict the penalties that will be levied by nature if present levels of management are not raised. This statement will reflect the urgency of the need for a desert management program to protect, preserve and enhance the desert environment.

2. The goals to be accomplished.

   In this document, a goal is considered to be an end toward which society aspires, not a precise or quantifiable term. It is a broad concept that may be reached along numerous pathways that may be shifted to meet changing times. Goals may be realized through the achievement of objectives of shorter range. Individuals and groups expressing their opinions and

aspirations help establish goals, and through the democratic process the people ultimately define them through the ballot box. It is expected that the public, individually, in groups, and through their elected representatives, will be the source of goal definition.

3. The objectives the plan is to achieve.

Objectives are specific, quantified interpretations of the goals. Objectives in this case will provide the specific targets through which the California Desert Plan is to achieve its goals. Thus, objectives become building blocks. Reached and in place, each becomes a measurable step toward goal achievement. The complexity and magnitude of the California desert dictates that the present innumerable objectives be identified and evaluated during plan development.

4. The desert's resources and uses.

The desert ecosystem is comprised of a myriad of physical and biological resources used singly and in combinations by multitudes of people who enter the system as individuals, organized groups, or masses, depending upon the season, weather and other factors that are presently undetermined. Information concerning desert resources will be obtained through an inventory procedure that combines principles of plant ecology, remote sensing, geological and geophysical studies and photo interpretation supported by adequate ground-truth established through field checks and research. Uses being made of desert resources will be determined through traffic counts, photo interpretation and survey techniques supported by field studies.

5. The allocations of desert resources among present and potential users and criteria to serve as the basis for resource allocation.

In the broad sense, the entire Desert Plan study is directed toward making land-use allocations. Resource-use allocations should be made only following exhaustive study of (1) the characteristics of the resources, (2) the needs or desires of resources users, (3) criteria on which to base allocations, (4) possible conflicts of land use, and (5) consequences of the land-use allocation.

6. The interrelationships of various levels of government, agencies, institutions, and individuals as they pertain to the desert.

The boundaries of the California desert encompass many levels of government, jurisdictions of local, state and federal agencies and institutions, and the activities of groups and individuals that are concerned with the desert ecosystem. Parts of the California desert are included in planning activities of various government agencies at different levels. For successful plan development and implementation, all planning efforts that impinge upon the desert must be coordinated. The majority of desert users are people who live away from the desert. They visit it only for special purposes and for limited times. These people provide the sharpest impact upon the desert. Their needs and desires must be given consideration in planning for desert management.

7. The activities and time sequence necessary to meet objectives of the plan.

The California Desert Plan will be realized through accomplishment of numerous activities. Activities must fall into a logical time sequence if overall objectives of the plan are to be achieved. Logical activity flow schedules will be established based upon necessary time sequences and priorities.

8. The information base necessary to implement the plan.

The information base necessary to develop and implement the plan will be constructed by generating new information through resource inventory and use studies, and through review, study, and summarization of data, reports, and manuscripts that now exist in libraries, research reports, agency reports, planning reports, and personal observations and communications. A sound information base is vital to the planning function.

9. The means for management to accomplish its objectives, including coordination of all recognized activities.

The activities required to perform the management function and achieve objectives for which the plan is designed will be described.

10. The value to society of managing the desert according to plan.

The California desert is now subjected to more than five million recreation visitor-days of use per year. With development of the desert, recreation use is expected to increase to more than 50 million visitor-days per year by 2000. The single fact that such numbers of people are making use of the desert for recreation has tremendous social implications. The reasons why people are using the desert, what they derive from use of the desert, what they are spending in terms of time and money to visit the desert and what they would be willing to give up to continue using the desert have not been adequately studied. Little thought has been given to the carry-over effects of desert use on the user. That is to say, how does use of the desert influence off-desert attitudes, behavior, and activities, if at all? Such questions will need to be answered to serve as justification for public investments in the California desert that are required to protect it as uses grow. The returns must of necessity be measured in other than strictly economic terms. The motivations for these uses of the desert are not specifically economic. There are, of course, economic benefits to be derived from investments in the desert. These also must be analyzed and evaluated in terms of social benefits. The trade-offs among all uses must be evaluated.

11. The development of a program of continuing research and study.

The California Desert Plan document will not be the end of planning but only a phase of an ongoing planning process for the desert. A plan, to be viable, must contain elements that provide for continual updating activities. Growth of population and use will soon render a fixed plan obsolete. Information for plan updating must be obtained through a program of research and study geared to provide the information inputs that will be required.

The Desert Plan will be developed utilizing the following premises as guidelines.

1. Use of the desert is increasing at an accelerating rate. Much of the present use of the desert is uncontrolled and destructive of fragile desert resources. To assure continued availability of desirable desert characteristics for present and future generations, a comprehensive plan of development, use, and management is imperative.

The California desert offers benefits and values to present and future generations. Many of these are being damaged and destroyed by present users. Management programs controlling use of the desert ecosystem will be developed to assure conservation of desert resources while providing the maximum allowable use of the resources.

2. The BLM has the authority and responsibility for managing that part of the desert ecosystem included within the public domain to:

   a. Provide for the public welfare and well-being.
   b. Enhance and improve environmental quality.
   c. Meet local, state and national goals of social and economic development.

These broad premises cover the range of public aspirations that are pertinent to California desert planning. They are not mutually exclusive, but interrelate. They are, however, sufficiently specific to provide guidance in determining goals and objectives.

Public welfare and well-being relate to personal, group and community aspirations. Included are security of life and health, personal income distribution, employment and population distribution.

Environmental considerations include conservation, preservation, restoration of natural and scenic resources and development of cultural resources. Lack of quality in the environment directly affects all levels of public welfare, population increase, and economic development. A quality environment, though valued very highly, has social implications that are not well defined. Planning must be directed toward rescue on the one hand and enhancement on the other, as well as toward conservation and preservation.

Economic development relates to increased income at local, state and national levels, increased employment, improvement of the economic base, improved income distribution, and improved services at all levels of government.

Social development has to do with improving those characteristics of the environment that pertain to life and the relationship of human beings in a community. The California desert, though removed spatially from the home community of the masses of

those who use it, is actually a significant part of the larger ecosystem in which masses work, live and recreate. People not only influence the desert; the desert influences people.

3. Components of the plan must be implemented immediately, prior to the completion of studies.

Some desert resources are now subjected to a degree of use that has destroyed, or will soon destroy, the very characteristics that make them useful or enjoyable. Deliberate acts of vandalism are defacing and destroying irreplaceable archaeological and paleontological sites, and some natural sites, such as the rare palm oases. Programs must be initiated immediately to halt these destructive forces. Programs to solve these critical problems will be combined with and form an integral part of the California Desert Plan.

4. The plan must encompass all of the 24 million acres within the California desert area, 12 million acres of which is included in the public domain.

The overall plan for desert management, development, and use must include all lands within the established desert boundaries. Extensive areas of other public and private lands located within the desert boundaries and the uses to which these lands are put will heavily impact public domain lands. Planning activities of all concerned with the desert ecosystem will be coordinated.

5. Maximum usefulness of the plan can be achieved only through user and public involvement in all phases of the plan's development and implementation (plan with the people, not for the people).

Awareness by the public and the public's active participation in the planning and decision making will be vital to the formulation and successful implementation of plans that are designed to achieve public goals. Elected officials and public institutions will be able to reflect many of these interests and attitudes. Many interested groups and individuals, however, have valuable ideas that are developing and which can contribute to and enhance planning. Public acceptability of the plan may be directly proportional to public involvement in the planning process.

6. The Desert Plan will be fully coordinated with planning units of the governmental subdivisions whose planning functions interface with those of BLM.

   Many different levels of government and governmental planning bodies are interested in and planning for special uses of portions of the desert. Activities of all planning bodies must be coordinated to prevent planning overlaps and resultant conflicts. Where present conflicts exist, they must be resolved in terms of their relationship to overall desert planning and public welfare.

7. The plan will be comprehensive, but will provide sufficient flexibility to allow for modifications as new and pertinent information becomes available. Periodic revisions of the plan will be necessary.

   Comprehensive long-range planning must embody mechanisms for periodic updating. The planning system must contain elements that provide for a continuous purging of outdated information and incorporation of information of new pertinency. Current updating provides the mechanism whereby a comprehensive plan can retain its flexibility and still meet the needs of changing times in a manner consistent with conservation of the desert resources. Periodic major revisions will be required to meet changing social goals. Even so, the plan still provides the logical pathway for goal achievement.

CHAPTER II

CALIFORNIA DESERT PLAN

OUTLINE AND GENERAL DISCUSSION

This outline and discussion is presented in the form that it might assume in the initial and future desert plan documents. The Desert Plan document is conceived as being updated and issued at intervals as changing conditions warrant. The document should be updated at about five-year intervals. The headings of the outline are intended to indicate the topics to be covered in the Desert Plan document. The discussion provides details and recommended contents but is not intended to comprehend all of the information that is to be included in the Desert Plan document. It is expected that the Desert Plan document will by reference include material independently produced during the planning study.

The outline covers the following general areas as major subdivisions of the Desert Plan document.

- The authority for and the scope of the desert plan.
- A description of the physical and biological environment of the desert.
- A description of the social and economic environment of the desert and vicinity.
- The planning goals and objectives and the planning methodology to be used in their achievement.
- The desert management program, encompassing the land-use allocations, programming activities and means of management.

The following discussion of each heading of the outline indicates the recommended content of the Desert Plan document.

I. INTRODUCTION

The introduction will present the basis and authority for the program, the concept of the Desert Plan, and any special descriptions that are required to inform the reader what is being presented, why the plan is being prepared, and what is contained in the remainder of the document.

A. Basis and Authority for Multiple-Use Planning and Management.

Reference to the specific authority by statute and description of the charge given to the agency.

B. Scope of California Desert Plan.

A statement of the range of planning and the relation of this planning to items of local, regional and national significance among the desert's resources.

C. Value of the California Desert Plan.

A statement indicating the value and significance of the plan. This should include a description of how the plan will be utilized as a tool whereby the desert area will be managed for the benefit of all.

D. Planning Activities by Others Influencing Desert Planning.

A listing of all planning activities by federal, state, and local agencies, and by private interests concerned with, participating in, or affecting desert planning or the California Desert Plan.

E. Concept of the California Desert Plan.

A statement of the concept of the Desert Plan as it is finally resolved.

F. Organization of California Desert Plan Document.

The organization and content of this document presenting the California Desert Plan.

II. PHYSICAL AND BIOLOGICAL ENVIRONMENT OF THE CALIFORNIA DESERT

This section presents an assimilation of all data, regardless of the source, on the physical and biological characteristics and resources of the California desert. Included will be the location and physical characteristics of the desert and the physical and biological resources of importance to desert-use planning, including geography, geology, climate, air, water, soils, minerals, vegetation, fish and wildlife, archaeological and paleontological, scientific, educational and historical, range and watershed resources.

A. Geography.

A description of the geographic particulars of the desert area and their relevance to the desert's resources and use.

B. Air.

A description of the air as a resource, specifically its relationship to and influence upon the uses of the desert. What is in the air of the desert, its quality for consumption by all life and how desert air will be affected by current proposed plans for the area that will be significant to the Desert Plan.

C. Climate.

A description of the global weather characteristics and general atmospheric circulation patterns as they influence the desert area. The general meteorology in the area, including cloud cover, winds, etc., and the amount and mechanism of rainfall production will be described. The statistics describing rainfall, temperature, evaporation, and incident energy, as they affect the desert plan, will be included.

D. Geology, Land Forms and Topography.

This section will include a summary geologic description of the origin and characteristics of the land features of the desert and any information concerning the physical characteristics of the desert that will relate to the utilization of the desert area for the required purposes.

E. Soils Resources.

This section will describe the physical and chemical properties of the soil and the soil classifications by characteristics relevant to the desert's uses, existing uses and potential.

F. Water Resources.

The existing water resources will be described in detail by major hydrographic areas and in relation to potential use areas. The descriptions will be statistical in recognition of the stochastic nature of rainfall, runoff and recharge, and water quality characteristics. Two categories of water resources exist in the desert area.

1. Surface waters.

The description will be by watersheds or by hydrographic areas and will include the frequency characteristics of peak and low flows and flow durations. Strategically located gaging stations, as available, will provide data for indexing and describing basin runoff. The chemical, biological, and temperature characteristics of the water will be set forth. Water will be described in terms of its origin, if possible, but the effect on flow or water quality of works planned for the near future will be included.

2. Groundwater.

The groundwater resource will be described in the detail required to satisfy the Desert Plan's requirement for quantity and quality information. This will include water reserves potentially available for agriculture, industry and urban development as well as water supplies for campsites, way stations, rest stops, and possible livestock and wildlife use.

G. Vegetation Resources.

This section will indicate the vegetation now existing in the desert area, a description of its uses and its relevance to the Desert Plan. A description of vegetation resources that are in danger of extinction and of the manner in which they are threatened will be included.

H. Fish and Wildlife Resources.

The fish and wildlife resources of the desert area will be described. The description will include their recreational, educational, scientific, economic and social values. Wildlife species of economic importance will be identified, including those that are pests or control pests. Rare and endangered species of fish and wildlife will be identified and discussed. The discussion will include species, habitat and population and environmental characteristics that threaten their continued existence.

I. Archaeologic and Paleontologic Resources.

This section will describe the archaeologic and paleontologic resources of importance to the Desert Plan. Primarily it will relate to their scientific and recreational significance. These resources will be described and located and their significance will be appraised.

J. Scientific, Educational, Aesthetic and Historical Resources.

Sites of historical relics of importance, geologic formations, and animal and plant life unique to the desert which may have scientific, educational, or historical values will be described in this section.

K. Rangeland Resources.

Under this section, vegetative cover now supporting or capable of supporting range livestock will be described. This description will include stocking rates and range condition. Range trend and utilization patterns will also be included where possible. Range management programs now being used will also be included.

L. Mineral and Energy Resources.

The mineral and energy resources and reserves of importance to the Desert Plan because of their economic significance or for other reasons will be covered. Mining operations that might affect the desert's land use will be included. The descriptions will include type of minerals, locations, reserves, and extraction methods.

M. Watershed.

This section will describe the watershed characteristics of the

California desert. Included will be information concerning erosion as related to kinds of soil, slope, exposure, topographic position, and water infiltration; vegetation as it relates to watershed characteristics; and other factors directly bearing on the functioning of watersheds, such as amount, intensity and distribution of rainfall and soil-disturbing land uses.

N. Recreation.

This section includes a description of physical characteristics of the desert resource that may have recreational potential. Recreational uses of the resources will include hunting, fishing, boating, water skiing, rock hounding, hiking, swimming and off-road vehicle use.

III. SOCIAL AND ECONOMIC ENVIRONMENT

This section will describe the prevailing social and economic environment of the California desert and its setting. The topics will include demography, employment, leisure time, economic activity, institutions, recreation, and their current relation to the use of the desert and the planning for the desert.

A. History of Habitation and Use.

Included here will be a historical review of the nature of settlement, the culture and types of people, and economic activity ensuing from such settlement as it relates to a description of the current general overall activity and categories of activity within the desert area and vicinity.

B. Demography of the Desert and Adjacent Metropolitan Areas.

The demographic characteristics of the population of the southern portion of the state of California, including size, density, distribution, vital statistics such as birth rate and death rate, and other items of importance in determining future trends, places of residence and any activities that would affect the Desert Plan will be described.

C. Social Aspects of the Desert.

This section will describe the living patterns and styles of desert area residents, their leisure time activities, and relationships to

their surroundings. The social system will be treated as separate from the economic fabric described later in this section. Environmental factors encouraging habitation in a given area will be described. Any negative environmental factors such as air or water pollution and congestion of traffic ways will be described. Each aspect would be described separately for urban and rural dwellers, and for residents within the desert and of the vicinity of the desert.

D. Economic Activity.

The economic fabric of the desert area and vicinity, including production of goods and services, earnings, employment and labor force capabilities, income levels among labor force, physical resource use in economic activities, will be described. Also included will be factors influencing the location of enterprises and their level of production. The description will focus on the elements that indicate future trends of importance to desert planning. The economic activities to be described would include industrial, mineral, agricultural (cultivated and intensive livestock), grazing livestock (rangeland livestock), recreation, services (business), and government (all levels).

E. Other Management Considerations.

1. Institutions.

The institutions here referred to are government and private organizations that control and serve the needs of desert users. The institutions having an influence on resource control, conservation and utilization will be emphasized. The description will include federal, state, county, city, and public districts and private organizations that serve the people.

2. Land Ownership.

This section will describe the land ownerships and their patterns and uses as pertinent to the Desert Plan. Included will be the effects different ownerships will have on the use of the desert.

3. Services.

Public and private groups and business enterprises that provide the water, power, transportation, and other services will be described. The intent is to include those services and

utilities that support the economic and social fabric of the desert area such as law enforcement, water, waste disposal, electricity and gas, transportation, communications, protection, trespass, cadastral, realty, and administrative.

IV. PLANNING GOALS, OBJECTIVES AND METHODOLOGY

This section will present the planning goals, objectives and methodology. It will record and interpret national and regional goals for the desert planning and management staffs. The specific objectives are to derive targets for the management program. The section will also include the analysis, reasoning and assumptions that are implicit in the objectives that the plan is designed to achieve. The methodology used to prepare the plan will be presented.

A. Desert Plan Concept.

This will be an elaboration of the specific items presented in Section I, INTRODUCTION. It will provide details of the overall impetus of the program for the guidance of the staff. It will provide the major points of reference for the planning activity.

B. National Goals.

This section will present the overall goals of the nation relevant to the desert. The sources of definitions will be the federal and state administrative agencies and legislation. The categories below are intended collectively to encompass all pertinent national goals.

1. Public Welfare and Well-Being.

   Relates to personal, group and community aspirations. Included are security of life and health, personal income distribution and interregional employment and population distribution.

2. Environment.

   Includes conservation, preservation, enhancement or creation of natural, scenic and cultural environment.

3. Economic Development.

Relates to development designed to enhance aggregate income to the nation. Included are economic investments and production base diversification for national reasons. Also relates to increased local income and employment, improved local economic base, improved local income distribution, and improved services. Goals for local economic development may or may not be at the expense of other locales or aggregate national income.

C. Regional Goals.

The goals of the region not in common with national goals are described in this section. The goal definitions are usually set by the state and local administration, private groups and public forums.

D. Elements of National and Regional Goals Specific to the Desert.

The analysis and results described here will be determined from factoring out the elements of the national and regional goals that will guide definition of objectives and Desert Plan preparation. The goals will necessarily be broad to encompass all areas of activities and as such will require analysis to insure objectives are properly defined. The analysis and judgments made will be described along with the conclusions as to the specific elements of the goals pertaining to desert-use planning and management.

E. Social and Economic Projections Pertinent to Goals.

This includes a description and projection of what is expected to occur for the categories of Section III, SOCIAL AND ECONOMIC ENVIRONMENT. Projections of past trends will not be the only technique used. Probable and possible future policies and conditions affecting the items will be assessed and analyzed and judgments will be recorded. Projections will reflect the goals and their impact on expected future conditions. Not all projections will be in numerical terms -- for example, institutions and social aspects of the desert. However, the descriptions of what is expected or may happen will be as specific as data and vision guided by professional judgments will permit. The projections will be reconciled with projections by others such as the U.S. Office of Management and Budget, and other state and federal planning studies. The categories are under these subheadings:

1. Demography.

2. Social Aspects.

3. Economic Activity.

4. Management Considerations

   a. Institutions
   b. Land Ownership
   c. Services

F. Planning Objectives by Land-Use Categories.

This category includes the specific objectives that are the targets for the desert-use planning activities and which the plan for desert management is designed to achieve. Objectives will be quantified, to the extent possible. They will be derived by translating goals specific to the desert land use into quantifiable terms that are capable of achievement by the desert's development, use, and conservation, and by consideration of expected future conditions.

1. General Definition of Categories and Procedures.

   The specific categories for which objectives are stated, reasons for the choice, and the detailed procedures used in their quantitive development.

2. Management Recommendation and Decision Boundary Determination.

   The criteria to be used for establishment and identification of unit boundaries are to be set forth.

3. Quantified Objectives, by Location and Time Without Constraints.

   The specific quantified objectives that the land-use categories for the Desert Plan are designed to achieve. The following list covers the range of potential land-use categories.

   a. Resource Activity.

      (1) Urban and Industrial Development
      (2) Agriculture
      (3) Water Resources Development

(4) Recreation

(a) Camping and Picnicking
(b) Rock Hounding
(c) Off-Road Vehicles
(d) Hiking and Sightseeing
(e) Hunting and Fishing
(f) Boating and Waterskiing, Swimming

(5) Rangeland
(6) Mineral Development
(7) Wildlife Habitat
(8) Scientific and Educational Preserves

(a) Archaeological and Paleontological
(b) Vegetative Preserves
(c) Wildlife (rare species)

(9) Open Space
(10) Military (buffer zones)
(11) Tenure Restricted
(12) Natural or Primitive Areas

b. Management Considerations.

(1) Transportation
(2) Support Services

G. Role of Participants.

1. Role of Bureau of Land Management.

The role of BLM as the lead agency in formulating the Desert Plan will include coordinating the activities and interests of all other agencies and of public user organizations in making the judgments and the decisions for the plan and in assuming the responsibility for the formulation and management of the plan.

2. Role of Other Participants.

The role of other participants will be to offer assistance and ideas in structuring the Desert Plan. Activities of all participants influencing the Desert Plan will be included. The participant

categories foreseen include:

a. Federal Agencies and Commissions.
b. State and Local Agencies.
c. Institutions.
d. Citizen Groups and Individuals.

H. Planning Methodology.

The methodology used in the planning activities leading to the Desert Plan will be described. The process of planning, the means of its performance, and guides used are in many respects a part of the plan and, as much as any other specific category, lend the plan the dynamism that indicates that plans are not ends in themselves but also the means of accomplishment.

1. Planning Concepts.

The delineation of especially pertinent planning concepts such as the public as decision maker, or the executive branch as decision maker or the latitude within which alternatives may be considered.

2. Formulation Procedures.

The procedures applied in formulating the management program, including the value criteria used, the means of integrating the multiple objectives and of resolving conflicts. The breakdown below indicates that the procedures are more than economic and imply the establishment of social and environmental values.

a. Social Value Criteria.

Answer the following questions: How much and what portion of investments need not produce economic returns? How are non-valued elements considered in formulating the plan? How does the plan relate to economic investments?

b. Economic Analysis.

Market values, interest rates and the general structure for market-valued analysis and decision criteria.

c. Environmental Analysis.

This section includes factors of an environmental nature not included in other categories, and procedures related to them such as evaluating the impact of air and water pollution and groundwater depletion. The objective is specifically to derive control criteria and guides for use in the formulation and execution of the plan and to determine its effects on the environment.

3. Interrelationships of Objectives of all Agencies, Institutions, and Groups.

It is apparent that some of the objectives will be complementary while others may not be. This item will contain discussion regarding the interrelationships, both complementary and competitive. This comparison will illustrate the complexity of the task of planning for multiple objectives in a comprehensive manner and will be written to assist in sorting out the important elements to be considered and how they interrelate. It is emphasized that the objectives are what is hoped to be achieved and are not necessarily possible of achievement in all instances. The land-use categories listed in F-3 above are those in which interrelationships may exist; some of them are again listed below.

a. Resource Activities.

(1) Urban and Industrial Development
(2) Agriculture
(3) Water Resources Development
(4) Recreation

(a) Camping and Picnicking
(b) Rock Hounding
(c) Off-Road Vehicling
(d) Hiking and Sightseeing
(e) Hunting and Fishing
(f) Boating and Waterskiing, Swimming

(5) Rangeland
(6) Mineral Development
(7) Wildlife Habitat
(8) Scientific and Educational Preserves

(a) Archaeological and Paleontological

(b) Vegetative Preserves
(c) Wildlife (rare species)

(9) Open Space
(10) Military (buffer zones)
(11) Tenure Restricted
(12) Natural or Primitive Areas

b. Management Considerations.

(1) Transportation Right of Way
(2) Support Services

4. Resolution of Conflicts.

The priorities and methods which will govern the choice of a solution where conflicts occur among objectives of public and private groups and agencies and/or value criteria are set forth. Factors to be considered will include:

a. Alternatives available
b. Degree of compatibility or incompatibility
c. Guidelines for selection among options.

V. THE CALIFORNIA DESERT MANAGEMENT PROGRAM

This section will set forth the results of the investigations and studies, and the negotiations and decisions that will define the program of desert management for the Bureau of Land Management that is developed through the Desert Plan. Included will be the land-use allocations, the programming activities, and the means of program management determined to best achieve the specific objectives delineated in Section IV. The section will include discussion of any items remaining in need of resolution before the management program can be fully implemented.

A. General Activities of the Management Program.

Introduction of the management program activities and brief description of their purposes, scope and interrelationships with the other activities.

B. Land-Use Allocations.

The allocation or apportionment of the available lands among use categories. This section coincides with activity planning prior to project development. The use categories may coincide with the listing of objectives in Section IV. The allocations will be indicated in the quantified terms appropriate to and consistent with the planning objectives.

C. Programming Activities.

Include the physical works (projects) and programs required to meet the specific objectives consistent with and guided by the value criteria. The projects and programs will be given in terms of the specific physical works, their functions, scales, and costs and their non-structural aspects in relation to specific objectives. They will be time framed. To the extent possible, the separable aspects (in terms of coordination of multiple objectives) will be presented.

1. Physical Works.

Works are projects to be constructed. The categories of works illustrating the intent of this subsection will be those for:

a. Roads and Trails
b. Way Stations
c. Camp Grounds
d. Visitors' Facilities

2. Management Programs.

Programs are non-physical works that achieve the objectives, or portions thereof. The following list is a sample of the types of programs foreseen as useful in meeting the objectives.

a. Resources Management
b. Enforcement (Ranger Force)
c. Information and Education
d. Public Safety
e. Fire Protection
f. Trespass
g. Communications

3. Selection of Alternatives.

   Descriptions and analyses of the alternatives for which the governing value criteria do not provide a firm enough basis to select a solution. The distinguishing elements of each alternative will be emphasized.

4. Interim Management Activities.

   The activities of a critical nature listed to be undertaken during the planning phase will be documented. The effects of the early decisions on the overall plan will be discussed. The experiences gained from the operation of the constructed way station and other interim activities will be recorded for reference.

D. Means of Management.

This subsection will present the means to achieve the planning objectives. It will address the overall strategies for assuring that allocations are made available through legal action, the timely construction of physical works and the initiation of programs. The categories required to describe this element of the program will not be known until the program is defined. The following list indicates the types of topics that probably will be required to be included:

1. The Continuing Planning Function.

2. Legal Authority.

3. Organization of Management Institutions

4. Operating Procedures and Policies

5. Financing (In Programming Process)

   a. Physical Works
   b. Programs
   c. Operation and Maintenance

The one element that may seem out of place in the above listing is the continuing planning function. Since a basic element of the concept is that the plan be continuously updated, it is apparent that a vital element of the management program will be this

function. It is the means of building flexibility, responsiveness and continuity into the program.

E. Reconciliation of Planning Objectives and the Management Program.

Certain objectives may not be possible to achieve because of conflicts with other priority objectives, failure to meet value criteria, lack of authority, or impracticability of accomplishment. These factors should be discussed and further actions or planning set under way to rectify the differences, both through adjustments in the objectives and in the value criteria. An explanation of discrepancies and a description of necessary adjustments will be needed.

F. Restraints on the Management Program.

There may be situations and conditions which restrain full operation of the management program. Additional legal powers or delegation of contracting powers or other authorities may be necessary for performance of elements of the programs. The program will operate without removal of the restraints but not precisely as determined best in the planning studies. These restraints are considered in a different category from those growing out of failure of the management program and objectives to coincide. This section discusses conditions restraining operation of components of the management program within the plan and includes:

1. General Aspects in Need of Resolution and Action and Delineation of Specific Restraints to Operation of Components of the Management Program.

2. Agency Reorganization.

3. Legal Adjustments.

    a. Laws Governing Management and Use
    b. Powers Governing Means of Management

4. Financing.

5. Personnel Ceiling.

6. Policy and Procedures.

7. Ownership Patterns and Boundaries.

8. Public Attitudes.

9. Decisions or Activities Outside the Direct Control of the Desert Plan Management.

CHAPTER III

ORGANIZATIONAL STRUCTURE

The basis for the organization proposed for conducting the California Desert Program is that the plan will be developed by an independent staff responsible directly to the State Director. This planning organization shown on The California Desert Plan Organization Chart (Figure 2) clearly delineates the relationships that have been described in its lines from and to the boxes. It will have a maximum of free access to the State Director's Technical Staff, to the District Managers, and to public agencies and user groups. The Plan Director and staff of the California Desert Plan Development Program will, in turn, receive guidance from the State Director's Technical Staff, District Managers, and the public and user groups. There will be no interference with present lines of communications between offices and among groups within the Bureau of Land Management. This staff organization is similar to the special studies organization approved for the pipeline study in Alaska.

Additional staff will be required to meet interim management responsibilities. The staffing requirement, as shown on Table 10, will be added to present District staff and is not considered to be a direct part of the planning organization. However, as shown in Figure 2, there will be considerable interaction between Districts' staffs and the Desert Plan Director's staff. It should be noted that the organization presented in this chapter is only to meet the BLM permanent staff requirements for the planning effort. As this program effort diminishes, members of this staff should be phased into the districts' accelerated management program resulting from the development plan or become the nucleus of the planning staff for other similar BLM programs.

The California Desert Planning staff will be separate so that it may proceed with the maximum of freedom toward preset goals. As it proceeds, it will have three major sources of influence: (1) inputs from the District Managers and their emergency interim operations, (2) technical guidance and review on a continuing basis from the State Director's Technical Staff, and (3) interplay of ideas and discussions with the public and user groups.

Traditional attitudes and established practices will be subject to review and potential change, and the planning staff, therefore, inevitably will be in controversial areas from time to time. For example, the planning staff will have to rely on interaction among user groups to wear off the rough edges of some proposals that might limit access to environmentally

fragile areas. The District offices, which have continuing managerial tasks to perform while the planning is going forward, will be buffered from disrupting controversy by the separation of the California Desert Planning staff. The California Desert Planning organization will be housed separately to indicate its status. It will have need of proximity to a good library and to the desert. The first priority proposal for its headquarters is near the campus of the University of California at Riverside. A second choice of location would be in the vicinity of Barstow.

The Plan Director will have, as indicated on the chart, a principal assistant, and the organization will have two major staff components, one oriented toward resources evaluation and one composed of resources planners. There will be three service branches: Administration; Information, Education and Technical Writing; and Program Control.

The Resources Planning staff will have primary responsibility for the resource inventory and analysis phases of the program as well as development of the overall plan. Members of the planning staff, in addition to their high subject matter capabilities, must be familiar with use of aerial photography and photo interpretation techniques. Also, members of the staff must have background experience in natural resource planning.

The Resources Evaluation staff will function as a service group providing highly specialized expertise to the Resources Planning staff. In addition, members of this staff will provide specialist overviews of the resource analysis and planning effort.

All members of both the Resources Planning and Resources Evaluation staffs will have frequent contact with various groups and individuals. Thus it is imperative that these people have the ability to work effectively with people of varying background and purpose.

The Resources Evaluation and Resources Planning staff directors must have the experience in their fields required to command the respect and facilitate the work and interchanges of the staff of specialists under them. The highly technical and management competence required for these two groups of positions demands a higher than usual grade structure. To meet these requirements, the Plan Director must be classified at GS-15; the Assistant Director, Resources Planning and Resources Evaluation Staff Directors at GS-14.

If planning staff directors in the Bureau of Land Management have not been classified at the levels herein suggested, this should not be considered as an unbreakable precedent when this group is established. No similar planning task of this extent has been undertaken within the Bureau.

Other federal agencies in California have classified planning personnel, who have no more complex tasks than those that are being assigned here, in grades comparable to the ones suggested for the California Desert Planning staff. Region II of the Bureau of Reclamation, a sister agency of the Bureau of Land Management in the Department of the Interior, has classified its Plan Division Chief at GS-15. (It has similarly classified other division chiefs.) The Bureau of Reclamation Regional Planning Division chief has jurisdiction over planning of water resources in an area about the same size as the California Desert's. He is involved with a large number of fields of specialized activities, though certainly no more than will be encountered in planning for the preservation of the desert environment in California. The District Office of the Corps of Engineers in Sacramento has an Engineering Division in which planning is concentrated and a Construction Division, each headed by civilians in Grade 15. A detached Hydrological Division, headquartered at Davis, but administered by the District, is also headed by a GS-15, even though it operates in a narrow field of specialization. The State of California Department of Water Resources has planning functions of a scope and complexity to compare with the California Desert Program. The Department of Water Resources grades and salary levels for planners and planning staff directors are comparable with those of the Bureau of Reclamation and the Corps of Engineers. For example, the Division of Resources Development is headed by a Division Engineer with a salary range of $1,976 to $2,432 per month.

Additionally, consideration should be given to the comparatively higher salary level existing in the State of California. Thus, successful competition for the expertise required to fill all of these positions from the specialist staff to the Plan Director requires a competitive salary range.

It is also believed that, since this plan formulation constitutes a first for the Bureau, much research and development work will be required. Research and development activities demand a very high degree of technical competence. The procedures and techniques developed will be utilized by other Bureau programs in the future. Thus more importance must be placed on this study and this serves to justify a salary range commensurate with the demands of the expertise required.

To be effective and accepted, planning must be done with a maximum of continuing public exposure, which accounts for the emphasis on two-way communication with public and user groups. The plan must be developed in full view of all interested groups so that new attitudes may have the opportunity to form with the passage of time as the weight of facts and the force of ideas that are developed in the process become familiar and understood. The Bureau of Land Management will be trying to reverse many

attitudes toward the public lands that have persisted in our culture since pioneer days. Today millions live near the deserts and have access to fragile ecological domains. Unless restraints on the uses of the desert come into play through public awareness and acceptance, deterioration of the desert environment will continue.

The information, education and technical writing specialists are proposed to provide the staff necessary to prepare and disseminate interpretive material as the program develops. They will work closely with the Director and his assistant, with the planning staff, and with public and user groups. The organization and plan of action herein envisaged will invite user-group participation at the outset and will encourage continued involvement with the California Desert Program during plan development and implementation.

The Program Control staff consists of two specialists, Program Control and ADP liaison specialist will provide ADP expertise to the Resources Planning staff and will coordinate planning staff computer needs with ADP program services.

CALIFORNIA DESERT PLAN
ORGANIZATION CHART

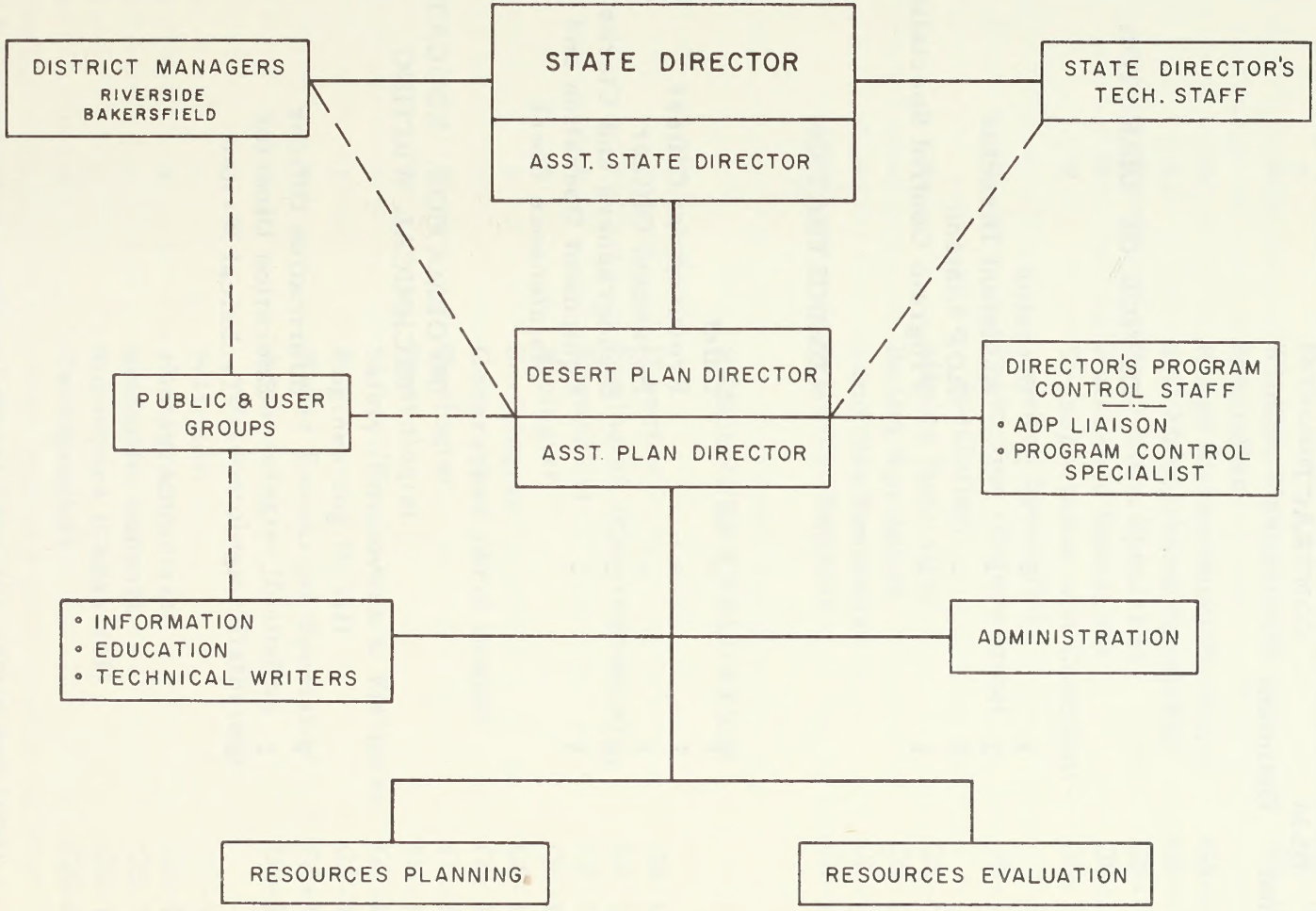


Figure 2

COORDINATED DESERT PLANNING STAFF

STAFFING STATUS			FUNCTIONAL TITLE	GRADE
BLM		CONTRACT		
Extended	Optimum			
			OFFICE OF DIRECTOR	
1	1	-	Director	GS-15
1	1	-	Assistant Director	GS-14
1	1	-	ADP Liaison	GS-13
1	1	-	Program Control Specialist	GS-11
			ADMINISTRATION	
1	1	-	Chief	GS-12
0	1	-	Procurement Officer	GS-11
1	1	-	Personnel Officer	GS-11
13	18	-	Stenographers and Clerks	GS-4-7
1	1	-	Equipment Operation and Maintenance Clerk	GS-6
			INFORMATION, EDUCATION AND TECHNICAL WRITING	
1	1	-	Information Officer	GS-13
1	1	-	Education Director	GS-12
1	2	-	Technical Writer	GS-11-12

STAFFING STATUS			FUNCTIONAL TITLE	GRADE
BLM		CONTRACT		
Extended	Optimum			
			RESOURCES PLANNING	
1	1	-	Director	GS-14
1	2	+	Wildlife Management Specialist	GS-11-13
2	3	+	Range Management(Ecology)	GS-11-13
1	1	+	Soil Management Specialist	GS-11-13
3	5	+	Recreation Specialist	GS-11-13
1	1	+	Watershed Specialist	GS-11-13
1	1	+	Transportation and Communication Specialist	GS-11-13
1	1	+	Protection (Enforcement Specialist)	GS-11-13
2	4	+	Mining Specialist	GS-11-13
1	2	-	Realty Specialist	GS-11-13
1	1	+	Land Use Specialist	GS-11-13
3	4	-	Scientific Support	GS-7-9
			RESOURCES EVALUATION	
1	1	-	Director	GS-14
1	1	+	Ecologist (Environmental)	GS-11-13
1	1	+	Economist	GS-11-13
1	2	+	Biologist	GS-11-13
-	-	+	Sociologist	GS-11-13
-	-	+	Geographer (Arid Zones)	GS-11-13
1	1	+	Geologist	GS-11-13
-	-	+	Hydrologist	GS-11-13
-	1	+	Safety (Employees & Visitors)	GS-11-13
1	1	+	Engineering (Civil)	GS-11-13
-	1	+	Water Resources Specialist	GS-11-13
1	1	+	Archaeologist (Including Paleontology, Historian)	GS-11-13
1	1	-	Solicitor	GS-11-13
1	1	+	Photogrammetrist	GS-11-13
1	2	-	Scientific Support	GS-7-9
3	3	-	Surveyors (Cadastral)	GS-7-11
2	3	-	Cartographer	GS-5-7

+ Indicates to be contracted to other federal agencies, state and local agencies, universities or consulting firms.

CHAPTER IV

SCHEDULE OF ACTIVITIES

The California Desert Program General Planning Network (Figure 3) presents the schedule of the major activities that must be undertaken and completed to prepare the initial optimized California Desert Plan documents. The schedule is based on the Desert Plan concept and the plan outline and it sets forth the critical dates. It reflects the emphasis which is to be placed on the determination of the goals, and the establishment of objectives and criteria in the plan formulation procedures. The activities in the chart are presented in sufficient detail to delineate the range of effort required in the preparation of the plan. The chart demonstrates through the use of dashed lines the interrelationship of the activities.

The completion date for initial document formulation represents a compromise balancing the critical need for the plan with efficient utilization of manpower and the total effort required to prepare the Desert Plan.

There is a continuing degradation of the desert ecosystem by the impact of virtually uncontrolled public use, including the recently popular "off-road vehicles". Unless immediate corrective measures are taken, many of the desirable environmental characteristics of the desert will be destroyed. Therefore, it is imperative that the development of the desert plan be initiated at the earliest possible date. The first critical date in the network schedule is fiscal year 1972. A delay of even one year will result in the loss of some scientific and historical sites, as well as rare plant and animal species that are unique to the California desert. These have priceless significance; fragile though they may be, they can and must be preserved.

The Desert Plan would play an important role in determining the specific uses to be assigned to the various ecological domains consistent with all of the demands to be placed on the desert and the sum of the protection that will be required. The need to authorize preparation of the California Desert Plan is now, not tomorrow.

The schedule for the preparation of the plan requires continuation of many of the present activities through the current fiscal year (1971) preliminary to initiation of the full planning effort. This effort will be important to the maintenance of the overall schedule for completion of the plan document and for proper development of the interim management activities.

Of prime importance is the coordination of the overall planning activity with the public and users groups. The coordination will develop many ideas

obtained from users of the desert. These ideas must become part of the Desert Plan if it is to effectively serve the demands to be placed on the desert in the future. Also, understanding and support of the restraints that must be incorporated into the plan if the desert is to be protected will result from interaction of the planning staff with the public and user groups.

Full coordination is also required between the BLM districts with interim management responsibilities and the planning activity. What is determined to be critical by the interim management program will affect what is to be included in the Desert Plan. The effects of this interaction will help establish priorities for development among the phases of the plan as well as among the uses to which critical areas may be assigned.

Figure 4, Integrated Plan Development Network, reflects the formulation of the overall plan. Essentially, the method adopted by BLM under its management planning system is used. The network is included to depict, though it is not intended to be all-inclusive, the single-purpose land uses that are to be considered during the planning process.

Figure 5, Interim Management Network, is a more detailed schedule of the Interim Management activity shown in Figure 3. Currently many critical areas requiring immediate remedial measures have been identified. Additional critical areas will be identified as the work proceeds. Implementation will be based on priorities to be established by these considerations. Though the schedule details only the plan period, activity will be phased into and continued under the Desert Plan implementation period. It, therefore, will be described as an integral part of the Desert Plan document.

Many of the activities indicated as having been completed on given dates in the schedule are completed only with respect to their statement in the planning document. Continuing activities will be required in order to update the plan document at predetermined intervals in the future. The activities, however, will require effort on a much smaller scale in the later periods.

The California Desert Program General Network (Figure 3) portrays and schedules activities in a logical sequence which will result in an Optimized Plan Development by January 1, 1977. An Extended Plan Development Program would result in essentially the same ultimate plan, but with a completion date of January 1980. A preliminary, less-detailed plan would be prepared to meet the now-scheduled plan completion date (January 1, 1977).

The nature of the overall planning effort would dictate that extension of activities or delayed scheduling would be limited to certain aspects of the program. For example, to maximize efficiency, aerial photography would be obtained as scheduled and development of ADP-systems would remain as now programmed to assure availability of computer programs for data

handling and analysis. In fact, most activities scheduled for 1971 and 1972 would remain virtually unchanged.

The extension of the planning effort utilizing a smaller technical staff would come primarily as a result of extending the period of data collection and analysis, scheduled for completion under the Optimized Plan in July 1975, over a period of an additional 3 years. Thus, less resource information would be available by 1977, and preliminary report (January 1977) would lack sufficient detail in many areas on which to base final management decisions. Integration and analysis of additional data and resolution of conflicts and planning would continue in the same relative sequential order as scheduled, (Figures 3 and 4) and a final, detailed California Desert Plan comparable to the end product of the Optimized Plan Development Program would be prepared by January 1980.

Activities now portrayed in the Integrated Plan Development Network (Figure 4) and Interim Management Network (Figure 5) would continue in the same order relative to the overall plan, but schedules would be extended to reflect delayed data collection and analysis and reduced planning effort.

CHAPTER V

BUDGET

The budget for the Desert Plan program has been evaluated under two separate activities: The Plan Formulation and the Interim Management. These activities, though analyzed separately for budget purposes, are interrelated. Activities under the Interim Management program will have definite effects on the overall Desert Plan. The Desert Plan is needed to assure the most beneficial use of the desert area. In addition it must serve management as a tool to assure proper implementation.

The budget is predicated on authorization to begin in fiscal year 1972. The budget summary for the Optimized Plan Development Program and Interim Management is shown on Table 1. Budget details for these programs are shown on Tables 2, 3, and 4. The budget summary for the Extended Plan Development Program is shown on Table 5. Details of the Extended Plan Development program budget are shown on Tables 6 and 7.

The budgets were derived by determining manpower staffing and direct costs associated for each activity within the total program. Job classifications and ranges in accordance with the organization chart were used to determine the average unit cost for each activity's manpower requirement. The unit cost shown for BLM personnel includes the necessary amounts for travel and per diem that will be required.

The distinction between consulting services and permanent BLM staff was made in recognition of the need to form a nucleous staff which would be maintained to reevaluate and implement the initial plan and to provide the competence to meet the highly specialized nature of the overall assignment. Consideration was given to the periodic peaking requirements of the specialty activities with peak needs to be met by contracting for consulting services with other federal agencies, state and local governments, universities and private consulting firms. The staffing schedule is shown for the Optimized Plan Development on Table 8 for Interim Management on Table 9 and for the Extended Plan Development on Table 10.

The unit costs for consulting staff include salaries, overhead and welfare costs normally charged for these services and are considered as an average for all levels of personnel required.

The office operation and maintenance costs assumed that a separate office will be established to perform the planning function. The costs are comparable to those prevailing in the local area. Office equipment costs are current with those available through the BLM procurement section.

It should be recognized that the budget costs presented are based on current costs. Therefore, if inflation continues, the costs will be significantly increased in future years. For example, if inflation continues at six percent per year, the overall average increase for the five-year plan program would be approximately 20 percent and for the eight-year plan program would be about 30 percent.

Manpower requirements and costs used in the Interim Management portion of the budget are those reported by the Task Force Committee created within BLM for these specific purposes.

The Plan Development budgets reflect only the initial plan period, not the planning costs involved to continually update the Desert Plan document. It is assumed that this cost will be included as a part of the implementation program.

This program is a first for BLM; therefore, there will be certain costs incurred that will have significance for future development of all studies of this type associated with BLM lands of a similar nature. Activities such as establishing goals, objectives, criteria, policies and procedures, ADP program development, analysis techniques and plan formulation would have broad application to other areas. For this reason it is believed that a percentage of these costs should be allocated to national BLM programs. A precise estimate of the percentage of planning development costs which should be charged to the overall BLM programs is difficult to assess. However, a careful study of the development aspects of the planning effort indicates that allocation of 40 percent of the plan development budget to national BLM programs would be realistic and justified.

Certain costs such as aerial photographs, office operation and maintenance costs, management and administration staff, and computer time for data storage, retrieval and analysis are all chargeable as Desert Plan formulation costs.

If the use of the percentage chargeable to the plan is deemed justifiable for the reasons and for the items stated as allocatable, the costs for the Optimized Plan development aspect of the California desert would be reduced to about $7.5 million.

1971 | 1972 | 1973 | 1974 | 1975 | 1976 | 1977 | 1978

BEGIN CORE STAFF RECRUITMENT 7-1-71

COMPLETE CORE STAFF RECRUITMENT 1-1-72

CONTINUING PRELIMINARY STUDIES

CONTINUE INTERIM MANAGEMENT 7-1-71

1-1-72 | 4-1-72 | 7-1-72 | 10-1-72 | 4-1-73 | 10-1-74 | 7-1-75 CONTINUE 4-1-76

CONTINUE DEFINE GOALS 1-1-72

COMPLETE DEFINE GOALS 4-1-72

CONTINUE ESTABLISH OBJECTIVES 1-1-72

4-1-72

COMPLETE INITIAL PHASE 7-1-72

COMPLETE ESTABLISH OBJECTIVES 7-1-74

CONTINUE POLICIES & PROCEDURES 1-1-72

4-1-72

7-1-72

COMPLETE 10-1-72

CONT. AOP PROGRAMMING 1-1-72

4-1-72

7-1-72

COMP. AOP PROGRAMMING 10-1-72

4-1-73

7-1-74

10-1-74

1-1-75

COMPLETE PLANNING AOP (THIS PLAN) 4-1-75

CONTINUE FOR FUTURE PLAN EVALUATION

CONTINUE ESTABLISH CRITERIA 4-1-72

7-1-72

COMPLETE INITIAL PHASE 10-1-72

4-1-73

COMPLETE CRITERIA 10-1-74

CONT. HIGH FLIGHT AERIAL PHOTOS & MAPS 7-1-72

COMP. HIGH FLIGHT BEGIN INTERMEDIATE FLT AERIAL PHOTOS & MAPS 4-1-73

4-1-74

COMPLETE AERIAL PHOTOS AND MAPS 7-1-74

COMPLETE INVENTORY OF AVAIL. DATA 4-1-72

BEGIN ADDITIONAL DATA COLLECTION 7-1-72

4-1-73

4-1-74

7-1-74

10-1-74

COMP. DATA COLLECTION (THIS PLAN) 1-1-75

CONTINUE FOR FUTURE PLAN EVALUATION

BEGIN DATA ANALYSIS 7-1-72

4-1-73

4-1-74

10-1-74

1-1-75

4-1-75

COMP. DATA ANALYSIS (THIS PLAN) 7-1-75

CONTINUE FOR FUTURE PLAN EVALUATION

BEGIN ESTABLISH UNIT BOUNDARIES 4-1-73

7-1-73

COMP. UNIT BOUNDARIES 4-1-74

BEGIN SINGLE PURPOSE PLANS 7-1-73

10-1-73

4-1-74

10-1-74

COMPLETE SINGLE PURPOSE PLANS 1-1-75

BEGIN RESOLUTION OF CONFLICTS 10-1-73

BEGIN LAND USE ALLOCATIONS 4-1-74

BEGIN INTEGRATED PLAN 10-1-74

1-1-75

7-1-75

COMP. PRELIM. INTEGRATED PLAN & HOLD HEARING 1-1-76

COMPETE INTEGRATED PLAN 4-1-76

BEGIN IDENTIFYING PROJECTS 1-1-75

4-1-75

BEGIN ESTABLISH PROJECT PRIORITIES 7-1-75

1-1-76

4-1-76

COMPLETE PRIORITIES 7-1-76

BEGIN PRELIMINARY REPORT 4-1-75

7-1-75

COMP. PRELIM REPORT, BEGIN FINAL REPORT 4-1-76

7-1-76

PUBLISH REPORT & HEARING 1-1-77

CONT. PUBLIC COORDINATION 1-1-72

4-1-72

7-1-72

PUBLIC AGENCIES AND USER GROUPS

4-1-73

10-1-73

4-1-74

7-1-74

10-1-74

1-1-75

7-1-75

HEARING PARTICIPATION 1-1-76

PUBLIC PARTICIPATION 1-1-77

AUTHORIZATION AND PLAN IMPLEMENTATION

CONTINUE PLANNING

DEPARTMENT OF INTERIOR

BUREAU OF LAND MANGEMENT

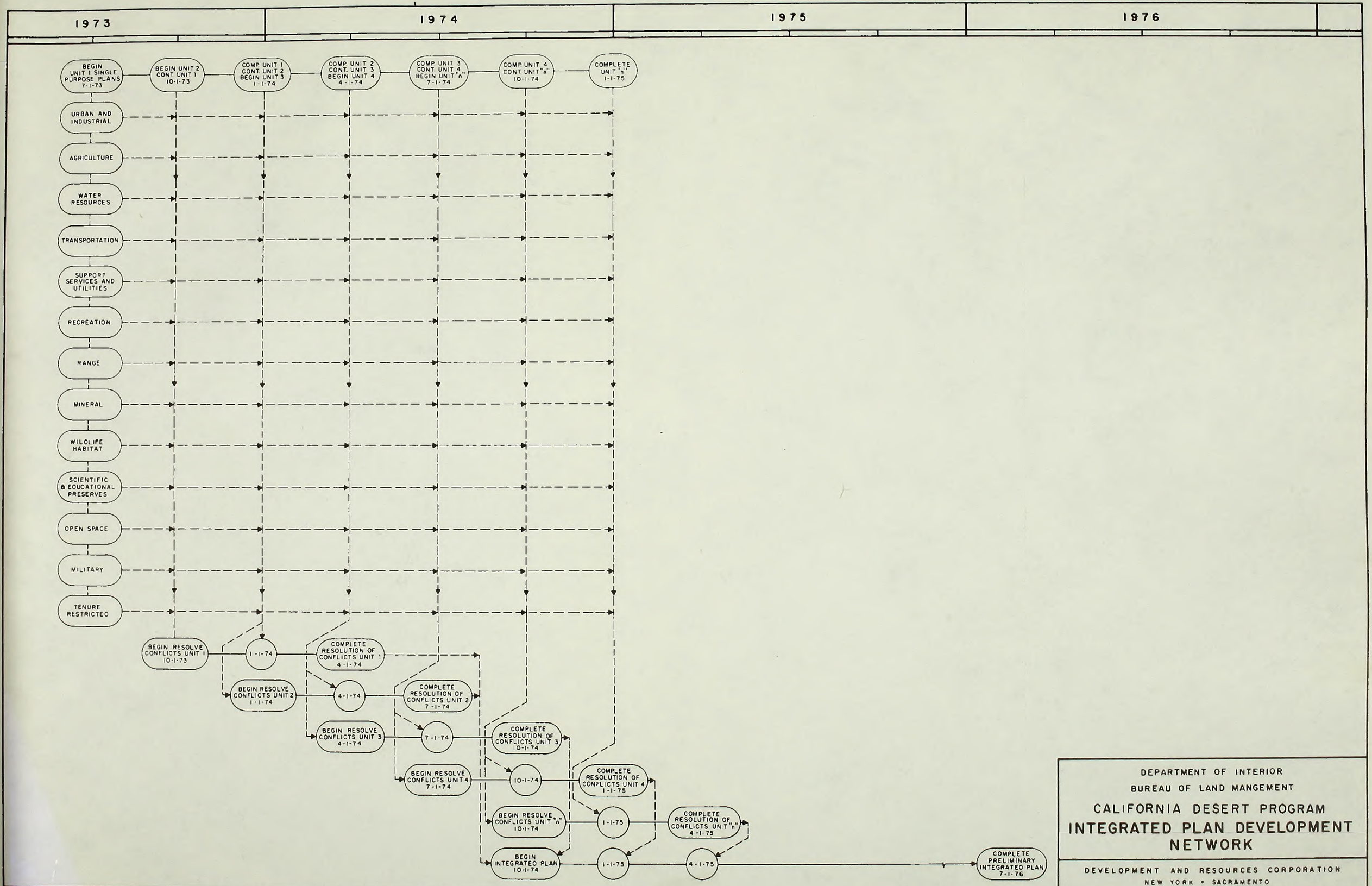
CALIFORNIA DESERT PROGRAM

GENERAL PLANNING NETWORK

DEVELOPMENT AND RESOURCES CORPORATION

NEW YORK • SACRAMENTO

Figure 3



DEPARTMENT OF INTERIOR

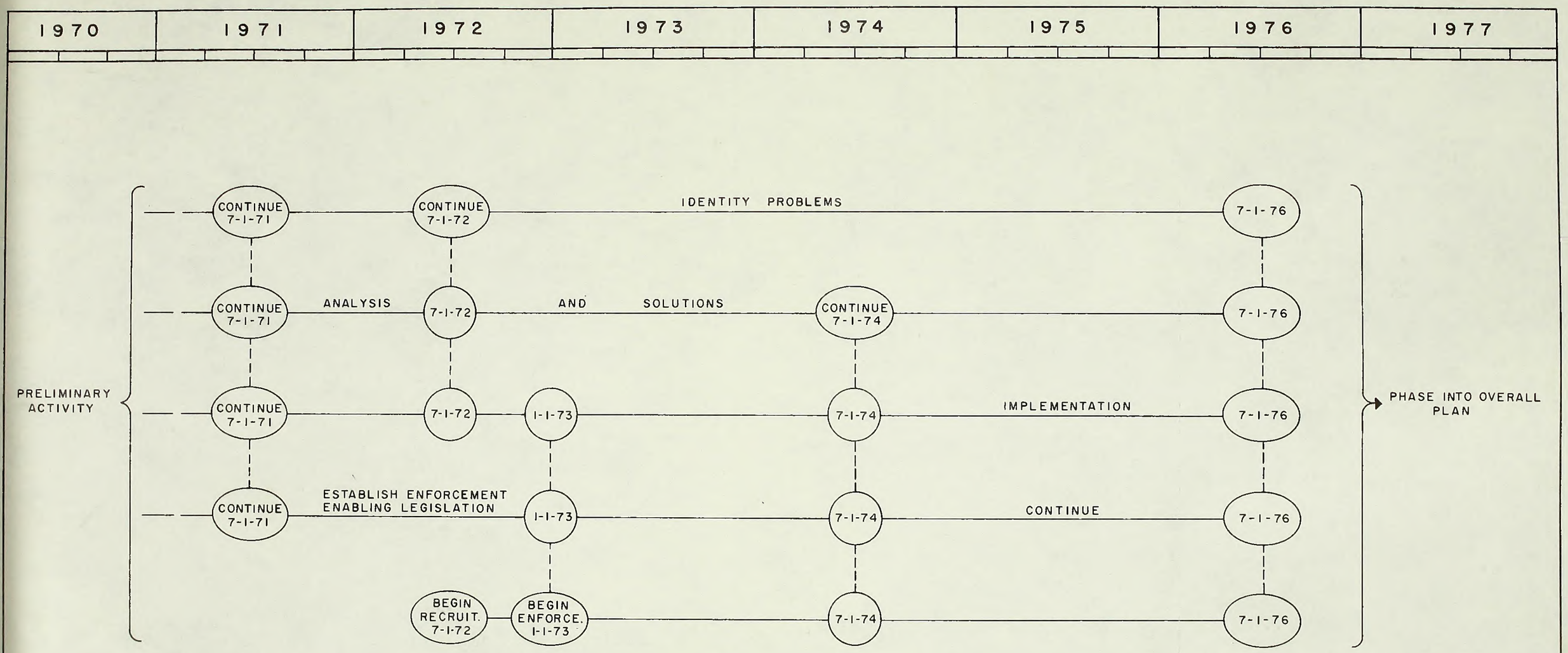
BUREAU OF LAND MANGEMENT

CALIFORNIA DESERT PROGRAM
INTEGRATED PLAN DEVELOPMENT NETWORK

DEVELOPMENT AND RESOURCES CORPORATION

NEW YORK • SACRAMENTO

Figure 4



DEPARTMENT OF INTERIOR
BUREAU OF LAND MANAGEMENT

CALIFORNIA DESERT PROGRAM

INTERIM MANAGEMENT NETWORK

DEVELOPMENT & RESOURCES CORPORATION
NEW YORK • SACRAMENTO

Figure 5

BUDGET SUMMARY

OPTIMIZED PLAN DEVELOPMENT

	1972	1973	1974	1975	1976	1977	Total
Manpower	386,200	1,647,600	1,640,800	1,606,800	1,306,500	559,900	7,147,800
Direct Costs	309,200	912,400	944,200	506,200	251,200	226,200	3,149,400
Overhead	115,900	494,300	492,200	482,000	392,000	168,000	2,144,400
Subtotal	811,300	3,054,300	3,077,200	2,595,000	1,949,700	954,100	12,441,600

INTERIM MANAGEMENT

Manpower	254,100	729,600	1,245,100	1,502,700	1,545,000	1,573,800	6,850,300
Contracts and Direct Costs	843,000	1,625,400	1,821,000	1,429,600	1,052,800	478,800	7,250,600
Overhead	76,200	218,900	373,500	450,800	463,500	472,100	2,055,000
Subtotal	1,173,300	2,573,900	3,439,600	3,383,100	3,061,300	2,524,700	16,155,900
Total	1,984,600	5,628,200	6,516,800	5,978,100	5,011,000	3,478,800	28,597,500

TABLE 1

MANPOWER AND COSTS

OPTIMIZED PLAN DEVELOPMENT

	Unit Cost Per Man-Month	1972		1973		1974		1975		1976		1977		
		Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Total
Define Goals	1,700	2	3,400											3,400
Establish Objectives	1,700	3	5,100	2	3,400	2	3,400							11,900
Establish Policy and Procedures	1,700	3	5,100	4	6,800									11,900
ADP Liaison	1,700	6	10,200	12	20,400	12	20,400	12	20,400	12	20,400	12	20,400	112,200
Establish Criteria	1,700	20	34,000	20	34,000	3	5,100	3	5,100					78,200
Aerial Photos and Maps														
Photogrametrist	1,700			3	5,100	3	5,100	3	5,100	3	5,100			20,400
Cartographers	700			36	25,200	36	25,200	36	25,200	33	23,100			98,700
Cadastral	1,700	18	30,600	36	61,200	18	30,600							122,400
Inventory, Data Analyses and Plan Development														
BLM Staff (Technical Specialists)	1,700	52	88,400	373	634,100	382	652,800	402	683,400	297	504,900	144	244,800	2,808,400
BLM Staff (Scientific Support)	1,000			60	60,000	60	60,000	60	60,000	60	60,000			240,000
Consulting Staff	3,000	20	60,000	158	474,000	158	474,000	158	474,000	124	372,000	20	60,000	1,914,000
Establish Unit Boundaries	1,700			6	10,200	18	30,600							40,800
Study Management Staff	2,200	15	33,000	24	52,800	24	52,800	24	52,800	24	52,800	24	52,800	297,000
Administration Staff														
Specialists	1,300	30	39,000	48	62,400	48	62,400	48	62,400	48	62,400	24	31,200	319,800
Clerical	600	78	46,800	228	136,800	228	136,800	228	136,800	207	124,200	132	79,200	660,600
Information, Education and Technical Writers	1,700	18	30,600	36	61,200	48	81,600	48	81,600	48	81,600	42	71,500	408,100
Subtotal (Manpower)			386,200		1,647,600		1,640,800		1,606,800		1,306,500		559,900	7,147,800
Overhead (30%)			115,900		494,300		492,200		482,000		392,000		168,000	2,144,400
Totals (Manpower)			502,100		2,141,900		2,133,000		2,088,800		1,698,500		727,900	9,292,200

TABLE 2

DIRECT COSTS

OPTIMIZED PLAN DEVELOPMENT

	1972	1973	1974	1975	1976	1977	Total
CONTRACTS - SERVICES							
Requiring Special Equipment							
ADP Program Services (Denver Service Center)	123,000	593,500	751,000	405,000	190,000	165,000	2,227,500
Archeological Exploration		20,000	15,000	15,000			50,000
Hydrogeological Exploration		75,000	50,000	25,000			150,000
Aerial Photo							
High Flight	100,000						100,000
Intermediate Flight		70,000	30,000				100,000
PROCUREMENT							
Aerial Photo							
High Flight (3 sets)	2,500						2,500
Intermediate Flight (3 sets)		48,000	32,000				80,000
Maps - Topographic		5,000	5,000				10,000
OFFICE - OPERATION AND MAINTENANCE							
Rent	30,000	40,000	40,000	40,000	40,000	40,000	230,000
Telephones	6,000	7,200	7,200	7,200	7,200	7,200	42,000
Office Equipment Maintenance	1,000	2,000	2,000	2,000	2,000	2,000	11,000
Office Supplies	2,000	2,000	2,000	2,000	2,000	2,000	12,000
Office Furniture and Equipment	39,700	39,700					79,400
Reproduction (Xerox)	5,000	10,000	10,000	10,000	10,000	10,000	55,000
TOTAL (DIRECT COSTS)	309,200	912,400	944,200	506,200	251,200	226,200	3,149,400

TABLE 3

BUDGET

INTERIM MANAGEMENT

	Unit Cost Per Man-Month	1972 Man-Mos.	1972 Cost	1973 Man-Mos.	1973 Cost	1974 Man-Mos.	1974 Cost	1975 Man-Mos.	1975 Cost	1976 Man-Mos.	1976 Cost	1977 Man-Mos.	1977 Cost	Total
MANPOWER														
Natural Resources Specialists (Problem Areas)	1,700	66	112,200	126	214,200	189	321,300	192	326,400	192	326,400	192	326,400	1,626,900
Natural Resources Technicians (Temporary)	1,000			42	42,000	75	75,000	96	96,000	96	96,000	96	96,000	405,000
Engineering Specialists (Permanent)	1,700	12	20,400	30	51,000	45	76,500	57	96,900	60	102,000	60	102,000	448,800
Civil Engineer (Temporary)	1,500	30	45,000	57	85,500	60	90,000	36	54,000					274,500
Technician (Temporary)	1,000			9	9,000	15	15,000	12	12,000	9	9,000	3	3,000	48,000
Communications Specialist	1,300	9	11,700	21	27,300	24	31,200	24	31,200	24	31,200	24	31,200	163,800
*Natural Resources Specialists (Rangers)	1,400	42	58,800	186	260,400	384	553,600	546	764,400	600	840,000	600	840,000	3,317,200
Dispatchers	800	3	2,400	18	14,400	42	33,600	63	50,400	75	60,000	96	76,800	237,600
Clerks (Permanent)	600	6	3,600	33	19,800	69	41,400	99	59,400	114	68,400	144	86,400	279,000
Clerks (Temporary)	500			12	6,000	15	7,500	24	12,000	24	12,000	24	12,000	49,500
Subtotal (Manpower)			254,100		729,600		1,245,100		1,502,700		1,545,000		1,573,800	6,850,300
CONTRACTS														
Way Stations														
Land Acquisition			160,000		160,000		60,000							380,000
Design and Construction			425,000		460,000		440,000		155,000					1,480,000
Furnishings and Exhibits			30,000		65,000		75,000		45,000		10,000			225,000
Desert Center														
Land Acquisition							500,000							500,000
Design and Construction					60,000		90,000		800,000		875,000			1,825,000
Furnishings and Exhibits													300,000	300,000
Problem Areas														
Construction			130,000		290,000		270,000		130,000		70,000		70,000	960,000
Consulting			15,000		20,000		15,000		8,000		3,000			61,000
Communications			29,000		25,000		25,000		25,000					104,000
Critical Recreation Site (Construction)			34,000		475,000		263,000		157,000					929,000
DIRECT COSTS														
Ranger Force Training			20,000		20,000		20,000		20,000					80,000
Way Stations Operation and Maintenance					2,400		6,000		9,600		10,800		10,800	39,600
Desert Center Operation and Maintenance													10,000	10,000
Critical Recreation Site Operation and Maintenance					48,000		57,000		80,000		84,000		88,000	357,000
Subtotal (Contracts and Direct Costs)			843,000		1,625,400		1,821,000		1,429,600		1,052,800		478,800	7,250,600
Overhead (30% of Manpower)			76,200		218,900		373,500		450,800		463,500		472,100	2,055,000
Totals (Interim Management)			1,173,300		2,573,900		3,439,600		3,383,100		3,061,300		2,524,700	16,155,900

* Multiple duty as Ranger and Resources Specialist

TABLE 4

BUDGET SUMMARY

EXTENDED PLAN DEVELOPMENT

	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
Manpower	297,300	1,177,800	1,147,200	1,116,600	1,116,600	1,116,600	1,116,600	858,900	467,400	8,415,000
Direct Costs	294,500	761,000	746,000	457,000	346,000	304,000	287,000	201,000	176,000	3,572,500
Overhead	89,200	353,300	344,200	335,000	335,000	335,000	335,000	257,700	140,200	2,524,600
Totals	681,000	2,292,100	2,237,400	1,908,600	1,797,600	1,755,600	1,738,600	1,317,600	783,600	14,512,100

TABLE 5

MANPOWER AND COSTS

EXTENDED PLAN DEVELOPMENT

	Unit Cost Per Man-Month	1972		1973		1974		1975		1976		1977		1978		1979		1980		
		Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Man-Mos.	Cost	Total
Define Goals	1,700	2	3,400																	3,400
Establish Objectives	1,700	3	5,100	2	3,400	2	3,400													11,900
Establish Policy and Procedures	1,700	3	5,100	4	6,800															11,900
ADP Program Liaison	1,700	6	10,200	12	20,400	12	20,400	12	20,400	12	20,400	12	20,400	12	20,400	12	20,400	12	20,400	173,400
Establish Criteria	1,700	20	34,000	20	34,000	3	5,100	3	5,100											78,200
Aerial Photos and Maps																				
Photogrametrist	1,700			3	5,100	3	5,100	3	5,100	3	5,100	3	5,100	3	5,100	3	5,100			35,700
Cartographers	700			24	16,800	24	16,800	24	16,800	24	16,800	24	16,800	24	16,800	24	16,800	12	8,400	126,000
Cadastral	1,700	18	30,600	36	61,200	18	30,600													122,400
Inventory, Data Analyses and Plan Development																				
BLM Staff (Technical Specialists)	1,700	20	34,000	229	389,300	238	404,600	258	438,600	261	443,700	261	443,700	261	443,700	162	275,400	120	204,000	3,077,000
BLM Staff (Scientific Support)	1,000			48	48,000	48	48,000	48	48,000	48	48,000	48	48,000	48	48,000	48	48,000			336,000
Consulting Staff	3,000	14	42,000	108	324,000	108	324,000	108	324,000	108	324,000	108	324,000	108	324,000	80	240,000	14	42,000	2,268,000
Establish Unit Boundaries	1,700			6	10,200	18	30,600													40,800
Study Management Staff	2,200	15	33,000	24	52,800	24	52,800	24	52,800	24	52,800	24	52,800	24	52,800	24	52,800	24	52,800	455,400
Administration Staff																				
Specialists	1,300	27	35,100	36	43,800	36	43,800	36	43,800	36	43,800	36	43,800	36	43,800	36	43,800	24	31,200	372,900
Clerical	600	57	34,200	168	100,800	168	100,800	168	100,800	168	100,800	168	100,800	168	100,800	159	95,400	96	57,600	792,000
Information, Education and Technical Writers	1,700	18	30,600	36	61,200	36	61,200	36	61,200	36	61,200	36	61,200	36	61,200	36	61,200	30	51,000	510,000
Subtotal (Manpower)			297,300		1,177,800		1,147,200		1,116,600		1,116,600		1,116,600		1,116,600		858,900		467,400	8,415,000
Overhead (30%)			89,200		353,300		344,200		335,000		335,000		335,000		335,000		257,700		140,200	2,524,600
Totals (Manpower)			386,500		1,531,100		1,491,400		1,451,600		1,451,600		1,451,600		1,451,600		1,116,600		607,600	10,939,600

TABLE 6

DIRECT COSTS

EXTENDED PLAN DEVELOPMENT

	1972	1973	1974	1975	1976	1977	1978	1979	1980	Total
CONTRACTS - SERVICES										
Requiring Special Equipment										
ADP Program Services										
(Denver Service Center)	120,000	490,000	571,000	374,000	263,000	251,000	239,000	153,000	128,000	2,589,000
Archeological Exploration		15,000	10,000	10,000	10,000	5,000				50,000
Hydrogeological Exploration		50,000	50,000	25,000	25,000					150,000
Aerial Photo										
High Flight	10,000									100,000
Intermediate Flight		70,000	30,000							100,000
PROCUREMENT										
Aerial Photo										
High Flight (3 sets)	2,500									2,500
Intermediate Flight (3 sets)		48,000	32,000							80,000
Maps - Topographic		5,000	5,000							10,000
OFFICE - OPERATION AND MAINTENANCE										
Rent	25,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	265,000
Telephones	5,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	6,000	53,000
Office Equipment Maintenance	1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	17,000
Office Supplies	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	18,000
Office Furniture and Equipment	35,000	35,000								70,000
Reproduction (Xerox)	4,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	8,000	68,000
TOTAL (DIRECT COSTS)	294,500	761,000	746,000	457,000	346,000	304,000	287,000	201,000	176,000	3,572,500

TABLE 7

QUARTERLY STAFFING SCHEDULE
(Permanent Staff)

OPTIMIZED PLAN DEVELOPMENT

	1972				1973				1974				1975				1976				1977			
Plan Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant Plan Director	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Natural Resources Planning Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Natural Resources Evaluation Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technical Specialists	-	-	6	18	32	32	32	32	32	32	32	32	32	32	32	32	25	25	20	14	10	10	10	10
Scientific Support	-	-	-	-	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	-	-	-	-
Cartographers	-	-	-	-	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	1	1	1	1
Cadastral	-	-	3	3	3	3	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administrative Specialist	1	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2	2
Stenographers and Clerks	1	4	9	12	19	19	19	19	19	19	19	19	19	19	19	19	18	18	17	16	15	15	7	7
Information Officer	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Education Officer	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technical Writers	-	-	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1
Systems Analyst	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
State Director's and District Staff	-	1	2	2	4	4	4	4	4	4	4	4	4	4	4	4	3	3	3	2	2	2	2	2
Totals	2	11	32	47	79	79	79	79	80	80	77	77	77	77	77	77	68	68	62	53	39	39	30	30

TABLE 8

QUARTERLY STAFFING SCHEDULE
(Permanent Staff)

INTERIM MANAGEMENT

	1972				1973				1974				1975				1976				1977			
Natural Resources Specialists (Problem Areas)	2	6	7	7	9	11	11	11	12	14	14	14	15	16	16	16	16	16	16	16	16	16	16	16
Engineering Specialist	1	1	1	1	1	3	3	3	3	4	4	4	4	5	5	5	5	5	5	5	5	5	5	5
Communications Specialists	-	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
Radio Dispatchers	-	-	-	1	1	1	1	3	3	3	3	5	5	5	5	6	6	6	6	7	8	8	8	8
Clerks	-	-	-	2	2	2	2	5	5	5	5	8	8	8	8	9	9	9	9	11	12	12	12	12
Natural Resource Specialists (Rangers)	1	1	6	6	11	11	20	20	28	28	36	36	44	44	47	47	50	50	50	50	50	50	50	50
State Director's and District Staff	-	1	1	1	1	2	2	2	3	3	3	3	4	4	4	5	5	5	5	5	5	5	5	5
Totals	4	10	16	19	26	32	41	46	56	59	67	72	82	84	87	90	93	93	93	96	98	98	98	98

TABLE 9

QUARTERLY STAFFING SCHEDULE

EXTENDED PLAN DEVELOPMENT

	1972				1973				1974				1975				1976				1977				1978				1979				1980			
Plan Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Assistant Plan Director	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Natural Resources Planning Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Natural Resources Elevation Director	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technical Specialists	-	-	4	12	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	22	16	16	13	10	10	10	10	10
Scientific Support	-	-	-	-	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	-	-	-	-
Cartographers	-	-	-	-	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1	1	1	1	1
Cadastral	-	-	3	3	3	3	3	3	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Administrative Specialist	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2
Stenographers and Clerks	1	4	6	8	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14	13	12	10	10	6	6
Information Officer	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Education Officer	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Technical Writers	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Computer Program Analyst	-	-	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
State Director's and District Staff	-	-	1	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	2	2
Totals	2	9	25	36	59	59	59	59	59	59	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	56	50	50	46	40	33	33	29	29

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TABLE 10

Library Bureau
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APPENDIX TO PLANNING GUIDELINES FOR THE CALIFORNIA DESERT PROGRAM

PREPARED BY

CALIFORNIA STATE OFFICE
BUREAU OF LAND
MANAGEMENT

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

JANUARY 1971

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APPENDIX D: PROTECTION REPORT

APPENDIX A

ADP - SUPPORT PROGRAM

COPY

Memorandum

To: State Director, California

From: Director, Denver Service Center

Subject: ADP Support - California Desert Program

We have reviewed your memorandum of December 28 which modified the previous budget submission from this office. We essentially concur with the kinds of assumptions which you have set forth in your California Desert Program and are anxious to provide the required support to this effort as the Bureau requires.

We have enclosed a budget estimate which modifies your enclosure with the above mentioned memorandum. You will note that we have re-established the requirements for computer operators and for project control. The computer operator requirement is essential to the running of computer programs to produce your requirements. The project control position is not identical to your program control position, but is one which is established to diagram the entire project and to maintain controls for your review as well as those ADP specialists who will be working on the project.

We understand that these estimates are to cover the planning requirements only and do not include the management aspects of the Desert Program. From that point of view we can accept the tapering-off of ADP requirements. As the Desert Program management is implemented into the operational mode, or as use is made of the data, the ADP requirements will undoubtedly change. The evaluation of estimates and support should be based on the situation at that time.

Any other modifications for support of the flow are minor in nature and, of course, we will continue to refine these estimates as better information becomes available.

G. H. Rudd

Enclosure 1
Budg. Estimate

COPY

Memorandum

To: State Director, California

From: Chief, Division of Data Processing

Subject: California Desert Program - ADP Support

The discussions of December 17-18 were very helpful in determining the basis for the ADP support package. The assumptions made were discussed with you and your staff and have been consolidated where possible in this memorandum. If you have any questions or feel the statement does not reflect the current understandings, please contact us for clarification.

A. Assumptions: General

1. The California Desert Program encompasses almost every professional discipline in BLM with varying degrees of involvement. The ADP system developed in conjunction with the Program in reality will be the prototype for a Bureau-wide land management information system for collecting and processing resource inventory data. As such, it is vitally important that constant coordination be maintained with other Bureau-wide systems being developed in the same time frame. Such systems should be complementary and not restrictive to the development of the Desert Program and vice versa.

2. The California Desert Program plan will focus primarily on inventory and analysis. The management program to begin in FY 77 will be emphasized after data collection and analysis of inventory implications have been made.

3. The basic land base control will be designed to accomodate both the geodetic coordinate grid system and the cadastral notation of legal land description. To facilitate initial speed in data gathering, the coordinate grid will be recorded as the land base first, and the cadastral notation will be gathered separately beginning around the third fiscal year of the plan. The precision afforded by cadastral notation is not necessary until then. The coordinate system will have the capacity for conversion into state plane and UTM grid systems.

4. The estimates contained herein will be evaluated as conditions change and adjustments made accordingly. The benefits derived from discussions with Canadian officials compiling a similar inventory under the Agriculture and Rural Development Act could influence the estimates significantly.

B. Assumptions: Specific

1. Processing inventory and use data is not required on an immediate access basis from the computer. Mail delivery is assumed sufficient for data transmission.

2. Approximately 80% - 90% of the resource inventory will be gathered from some type of imagery which can be automatically transferred into a machinable media without intermediate manual coding. The remaining 10% - 20% of resource inventory data will be gathered from sources such as the Bureau of Mines, Geological Survey and State government departments.

3. Approximately 75% of the resource use inventory will be gathered manually from Federal, State, Local governments and user groups. The remaining 25% of resource use data will be gathered through imagery as in 2 above.

4. A digitizer, photodensitameter or other automatic transition device will be leased (with purchase option) for an estimated 30 months unless the purchase option is exercised prior to that time at a savings to BLM.

5. Coding of imagery, use data, and all manual data input into machinable media will be the responsibility of the Desert Program team and is not included as an ADP cost estimate item.

6. Automated data will be actively sought from government and private sources to reduce manual coding. It is assumed this data will be available without cost.

7. The updating and changing of data collected will be provided to the ADP Division by the Desert Program team.

8. Two of the programmer positions in the D & R study will be dropped and one analyst position retained as full time liaison with the central ADP staff. (The cost of this position has been included in the ADP support estimate so all ADP required support can be isolated.)

9. Key punch positions are included in the estimate for key punching computer programs and not general data.

H. E. Forsee

CALIFORNIA DESERT PROGRAM
ADP DIVISION SUPPORT
ESTIMATE - 100% LEVEL
Optimized Plan Development

PERSONNEL COSTS	FY 72	FY 73	FY 74	FY 75	FY 76	FY 77
Analysis	48mm (4)	72 (6)	72 (6)	12 (1)	12 (1)	12 (1)
Programming		96 (8)	120 (10)	24 (2)	24 (2)	24 (2)
Software	6mm (1)	36 (3)	60 (5)	12 (1)	12 (1)	12 (1)
Operations (Computer Operators)		45 (5)	60 (5)	24 (2)	24 (2)	24 (2)
Key Punch		48 (4)	48 (4)	39 (4)	12 (1)	12 (1)
Computer Aids		36 (4)	48 (4)	39 (4)	12 (1)	12 (1)
Administration	12mm (2)	24 (2)	24 (2)	24 (2)	12 (1)	12 (1)
Project Control	6mm (1)	12 (1)	12 (1)	12 (1)		
Total Man-Months & (Positions)	72mm (8)	369 (33)	444 (37)	174 (16)	108 (9)	108 (9)
Total Personnel Costs (Including travel)	$108,000	$415,500	$473,000	$205,000	$115,000	$115,000
HARDWARE COSTS Input/Output/Processing	$ 15,000	$178,000	$278,000	$200,000	$ 75,000	$ 50,000
TOTAL ADP SUPPORT COSTS	$123,000	$593,500	$751,000	$405,000	$190,000	$165,000

GRAND TOTAL = $2,227,500

CALIFORNIA DESERT PROGRAM
ADP DIVISION SUPPORT (Estimate)
EXTENDED PLAN DEVELOPMENT

PERSONNEL & COSTS	FY 72		FY 73		FY 74		FY 75		FY 76		FY 77		FY 78		FY 79		FY 80	
	MM	No.	MM	No.	MM	No.	MM	No.	MM	No.	MM	No.	MM	No.	MM	No.	MM	No.
Analysis	44	4	72	6	48	4	12	1	12	1	12	1	12	1	12	1	12	1
Programming	--	--	96	8	96	8	24	2	24	2	24	2	24	2	24	2	24	2
Software	6	1	36	3	60	5	12	1	12	1	12	1	12	1	12	1	12	1
Project Control	6	1	6	1	12	1	12	1	--	--	--	--	--	--	--	--	--	--
Operators	--	--	27	3	36	3	36	3	36	3	36	3	24	2	12	1	12	1
Key Punch	--	--	24	2	36	3	36	3	24	2	24	2	24	2	12	1	12	1
Computer Aids	--	--	24	2	36	3	36	3	24	2	24	2	24	2	12	1	12	1
Adm.	9	2	24	2	24	2	24	2	24	2	12	1	12	1	12	1	12	1
Total Man Months & (Positions)	69	8	309	27	348	29	192	16	156	13	144	12	132	11	96	8	96	8
Per Costs	$ 69,000		$309,000		$348,000		$192,000		$156,000		$144,000		$132,000		$ 96,000		$ 96,000	
Travel	$ 36,000		$ 31,300		$ 23,900		$ 7,000		$ 7,000		$ 7,000		$ 7,000		$ 7,000		$ 7,000	
Total Per Costs	$105,000		$340,000		$371,000		$199,000		$163,000		$151,000		$139,000		$103,000		$103,000	
Hardware Costs	$ 15,000		$150,000		$200,000		$175,000		$100,000		$100,000		$100,000		$ 50,000		$ 25,000	
Total	$120,000		$490,000		$571,000		$374,000		$263,000		$251,000		$239,000		$153,000		$128,000	

GRAND TOTAL $2,589,000

Estimates by D&R based on optimized plan ADP budget

APPENDIX B

PILOT RESOURCE INVENTORY REPORT

ECOLOGICALLY BASED

RESOURCE INVENTORY TECHNIQUE

STUDY

by
Billy Templeton, Field Party Chief (Ecologist)
John Mezes, Ecologist
Stuart Porter, Soil Scientist
Mike Ryman, Minerals Engineer

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EVALUATION OF

RESOURCE INVENTORY TECHNIQUE STUDY

Dillard H. Gates

A major portion of the planning function for the California Desert is dependent upon comprehensive inventory of resources. Resources inventory techniques developed by Dr. Robert N. Colwell, Forestry Remote Sensing Laboratory, University of California and Dr. C. E. Poulton, Professor of Range Ecology, Oregon State University, as part of the NASA research programs, were evaluated for their suitability for use in the California Desert Program.

On September 15, 1970, Dr. Colwell, Dr. Poulton assisted by Dr. Gates of the Bureau of Land Management conducted a seminar on remote sensing and resources inventory techniques and aerial photo interpretation for the California staff of the Bureau of Land Management. It was generally agreed that techniques presented could be utilized in an inventory of the California desert. An area of approximately 24 square miles in southeastern California was selected for a pilot inventory. This area was primarily selected because of the availability of Apollo 6 and 9, high flight, and conventional aerial photography coverage.

Subsequently a more detailed feasibility and planning seminar for a selected group of California Bureau of Land Management staff was conducted by Dr. Poulton and staff from Oregon State University and Dr. Gates of the Bureau of Land Management. In this seminar ecological resources inventory and analysis procedures were discussed in detail. Following the seminar a Bureau of Land Management field inventory team spent two days in the pilot area with Dr. Poulton and staff studying field inventory procedures.

A resources inventory utilizing available imagery and based upon concepts and procedures referred to above, was conducted by the field inventory team. A copy of the report describing and evaluating the inventory follows this statement.

SUMMARY AND CONCLUSIONS

Some advantages and disadvantages of the ecologically based multi-stage resource inventory used in the pilot study are listed below:

Advantages

1. Provides broad perspective of large segments of the landscape.
2. Permits stratification of landscape into segments for selection for more intensive mapping.
3. Provides rapid inventory of large areas at a cost of $0.33 per acre. (including training of the inventory team).
4. Intensity of mapping can be increased as photo scale is increased and more resources information is required.
5. Lower intensity small scale mapping serves as a base for more intensive mapping using larger scale photography.
6. Permits mapping of all areas but with varying intensity as required.
7. Resource information acquired by more intensive mapping is added to low intensity mapping information.
8. Provides uniform mapping standards for the entire desert area.
9. Aerial photo interpretation with adequate ground truth allows limited sampling across broad resource areas.
10. Aerial photo interpretation and pre-typing by competent inventory team resulted in 90 percent accuracy as verified by field checks.
11. Competent resource technicians can function effectively on inventory team with a minimum of training.
12. Mapping legend can be modified, prior to beginning of inventory, to obtain other or additional resource information.
13. Use of aerial photography and photo interpretation permits easy access to resource information difficult or impossible to obtain from the ground.
14. Interrelationships of various desert resources are readily apparent.
15. Basic resource information allows resource specialists to make interpretations of inventory data from his point of view.
16. The ecologically oriented resource inventory becomes a timeless base to which other information can be added as acquired.
17. Inventory techniques are equally applicable using various types of imagery (black & white, color infra red, regular infra red).
18. Provides a resource base map over which innumerable interpretative overlays can be developed showing relationship between basic resources and present or proposed land uses.

Disadvantages

1. Provides limited surface geological and minerals information.
2. Requires highly competent inventory team.
3. Inventory team members must be able to use stereoscope.
4. Present legend may need to be modified to provide more complete soils and geology information.
5. Additional information may be required for some other specific uses.
6. Resource specialists not familiar with inventory techniques may require training to permit them to make full use of information provided by the inventory.

The pilot resource inventory report verifies the usefulness of the resource inventory techniques utilized. These techniques and procedures should form the basis of an ecologically based resource inventory for the California Desert Program. The information provided concerning vegetation-soil systems, land forms and surface geology serves as a basis for resource analysis and planning. In addition, the inventory system has sufficient flexibility to allow inclusion of additional detailed resource and interpretative information if required for a specific purpose.

Wildland resource inventories which take other than an ecological approach cannot provide adequate information necessary to consider alternatives for land use planning.

ILLUSTRATION OF SAMPLING TECHNIQUE

Imagery utilized in the resource inventory consisted of (1) Apollo 9, Color IR (Scale 1:780,000), (2) High flight B&W (Scale 1:141,000) and (3) Conventional B&W (Scale 1:24,000). The three scales of imagery provided the basis for a multi-stage sampling procedure. The multi-stage sampling procedure provided inventory flexibility and guidelines for selection of specific land areas for more intensive inventory and study. Mapping intensity and detail of resource information were increased as additional information was needed utilizing larger scale imagery.

The scale of the space imagery allowed low intensity mapping as well as stratification which in turn provided the basis for greater intensity mapping utilizing the high flight and conventional photography. Low intensity mapping from space photography, though utilized in this inventory as a first stratification, is also valuable for large scale regional and county planning. Intermediate and large scale imagery permits high intensity mapping that provides resource information with sufficient detail for resource allocation and land management planning. The information concerning vegetation-soil systems, land form and cultural features provides the basis of interpretation of resources as to their suitability for such uses as wildlife habitat, recreation, range, watershed, agriculture, urban development, etc.

A sample of resource inventory information obtained in the pilot resource inventory is presented on a photo mosaic (Figure 1, Ecologically Based Resource Inventory Technique Study).

A sample of a major mapping unit of the resource inventory is represented by the mapping legend:

$$3\ \frac{21.12}{2a\ CF} \qquad 1\ \frac{21.94}{2a\ Ba} \qquad 6\ \frac{14.4}{2a\ Cf}$$

The vegetation, land form, soil, and geology legend descriptions are included in the pilot inventory report. Soils and parent material information though omitted from the mapping legend was included in the inventory. A descriptive legend of this mapping unit delineated on the photo mosaic (Figure 1) provides the following resource information:

1. The mapping unit is a complex consisting of three taxonomic units.
2. Each taxonomic unit, including the percentage of the mapping unit it occupies, is described.
3. The taxonomic unit portrayed by the legend $3\ \frac{21.12}{2a\ CF}$ has the following characteristics:
   (a) It occupies 30 percent of the mapping unit.
   (b) This desert vegetation unit is characterized by Larrea tridentata and Franseria dumosa with few cacti and other shrubs except in drainage ways or depressions. This type covers the bajadas and plains which may or may not also support other vegetation in the runnels.

       The shrubs are scattered and the bare ground area is high. Runnels extending far down the bajadas in the most arid regions seldom carry water to their distal ends from the

desert mountains. Their distal ends may support little or no vegetation different from that on the interfluences.

(c) The landscape is rolling or gently hilly; a regional slope is not readily apparent or a regional slope of 10 percent to 25 percent is present.

(d) The taxonomic unit is on an alluvial fan or terrace. The slopes are ecologically significant by virtue of a change in vegetation and/or soil with the change in slope.

4. The taxonomic unit portrayed by the legend $1\ \frac{21.94}{2a\ Ba}$ has the following characteristics:

(a) It occupies 10 percent of the mapping unit.

(b) The desert vegetation is characterized by Cercidium floridum, Prosopis juliflora and Olneya tesota with assorted shrubs that may be predominant. It is found on flood plains and drainage ways.

(c) The landscape is rolling or gently hilly; a regional slope is not readily apparent or a regional slope of 10 percent to 25 percent is present.

(d) The taxonomic unit is found on narrow stringer bottoms but not in young "V" shaped canyons and drainages.

5. The taxonomic unit portrayed by the legend $6\ \frac{14.4}{2acf}$ has the following characteristics:

(a) It occupies 60 percent of the mapping unit and consists of desert pavement.

(b) The landscape is gently rolling or gently hilly; a regional slope is not readily apparent or a regional slope of 10 percent and 25 percent is present.

6. An example of soils and parent material information provided by the inventory and ordinarily represented in the mapping legend follows:

(a) Soils - 42

The soil is a deep silt loam matrix with coarse (1/4 - 1/2 inch) quartz particles throughout and on the surface. Quartz grains although not cemented, form a dense, compacted, very hard mass at depths below 3 to 4 inches but break out as single grain particles. The soil is slightly alkali and calcareous throughout (pH 8.2-8.4). Depths of deposits in excess of 40 feet were noted in creek banks with varying size particle stratification.

(b) Parent materials - 11

The parent material consists of coarse grained acid igneous deposits from the mountains to the north. Weathering of Luco granite high in quartz and plagioclose feldspars resulted in coarse quartz particles intermixed with the more easily weathered feldspars which constitute the matrix of the solum.

ECOLOGICALLY BASED

RESOURCE INVENTORY TECHNIQUE

STUDY

Introduction

An area of approximately 300,000 acres in Imperial County, California was inventoried in October and November of 1970. The south boundary is the All American Canal from the Colorado River to the beginning of the Coachella Canal. On the west the boundary lies along the Coachella Canal to its intersection with the Range Line common to Ranges 17 & 18 East, S.B.M. then northward along the line to its intersection with the Township Line common to Townships 13 & 14 South, S.B.M. The north boundary lies along the Township Line common to the Townships 13 & 14 South from the described intersection to the Colorado River. The east boundary lies along the Colorado River from its intersection with the Township line common to Townships 13 & 14 South to the beginning of the All American Canal.

A segment of a photo mosaic showing mapping units and legend is presented in Figure 1.

Figure 1. Photo mosaic showing mapping unit and legend.

Objectives

1. The resource inventory was conducted to determine the usefulness of an ecologically based survey for the collection of multiple land use data. This would depend upon identifying a relationship between a recognizable soil-vegetation system and one or more specific land uses.

2. The second objective was to develop a numerical legend supported by a descriptive legend which would facilitate computer storage of inventory data for immediate recall and use.

Procedures

A survey team, consisting of 2 ecologists, 1 soil scientist and 1 minerals engineer, was selected to conduct the survey. The team examined approximately one-tenth of the area in some detail to gain knowledge of the soil-vegetation systems characteristic of the total survey area. The descriptive legend was then refined to include all new soil-vegetation systems encountered.

The remaining nine-tenths of the area was inventoried by aerial photo interpretation in the office. The accuracy of the interpretation was spot checked on the ground.

Results

Accuracy of Interpretation - Accuracy was 90% $\pm$ in identifying plant communities.

In detecting soil-vegetation systems by aerial photo signature in the interpretation phase, color differences sometimes resulted from a difference in the soil surface rather than the prominant vegetative cover. Differences in the vegetation were often so subtle that they were not significant for management purposes, even though a distinct color differentia was apparent on the photo.

Some significant differences which were not detectable by interpretation included the photographic signatures of brittle bush (Encelia farinosa) and bursage (Franseria dumosa), the relative density of herbaceous and subshrubs in total density, soil type in relation to indicator species and minerals in relation to indicator species. Some of these differences can be interpreted by associating topography and land form with color differences.

A percentage accuracy figure would be unrealistic, since most of the erroneous interpretations were errors of degree rather than actual misinterpretations.

Types of Error

1. Relative importance of the components of a complex.

2. Substitution of bursage for brittle bush in association with creosote bush.

3. Photographic color changes without on-the-ground vegetative changes of management significance.

Usefulness of the Survey

Certain land uses can be identified by soil-vegetation systems relationships.

Wildlife:

1. The distribution of burro mule deer corresponds to the distribution of ironwood.

2. Dove nesting is in association with the riparian vegetative type.

3. Bighorn habitat can be identified by combining vegetation and land form information.

4. Upland game habitat can be identified by combining vegetation and land form information.

Watershed:

1. Watershed protective cover can be identified.

2. Erodability of soils can be identified.

3. Drainage patterns and land forms aid in evaluating a watershed.

Livestock:

Although not a factor in this area, livestock forage types could be identified.

This study was limited, because only black and white photography was available. More detailed interpretation could be made using 1:20,000 color I.R. photos in combination 1:10,000 black and white for management detail.

The value of this inventory technique is in coverage of large acreages in a very short time and at a low cost per acre. The inventory data yielded is useful in almost all phases of land management. Therefore, this is a practical technique for use in a resource inventory of a large area like the California desert.

The costs were as follows:

Training for 4 men

Vehicle & per diem	$1,400.00
Salaries	1,900.00
Total Cost	$3,300.00

Inventory on 300,000 acres

Vehicle & per diem	880.00
Salaries	5,800.00
Total	$6,680.00

Cost per acre after training:

$6,680.00 + 300,000 acres = $ .022 per acre

Cost per acre including training:

$9,980.00 + 300,000 = $ .033 per acre

The legend development phase of the study consisted of the refinement of an already existing legend developed by Dr. Charles Poulton and associates of Oregon State University. The legend consists of a combination of numerals and letters keyed to a descriptive legend. The symbolic legend would presumably make computer storage of inventory data practical. A legend of this type can be made applicable to the area under study and was used. (See Appendix #1, 2 & 3).

It is the feeling of the study team that objective #1 has been satisfied. Photographically identifiable soil-vegetation systems can be associated with land uses such as range, wildlife and watershed. Where photography is available, this technique should be used to obtain extensive inventory data for use in URA & MFP development. In objective #2, a usable legend was developed. Its relationship to computer storage of data must be evaluated by someone outside the field study team.

An Ecosystem Legend Format for Range Resource and Land Use Analysis from Space and Supporting Aircraft Imagery.

(Adapted from information provided by Dr. C.E. Poulton, Oregon State Univ.)

Generalized Form:

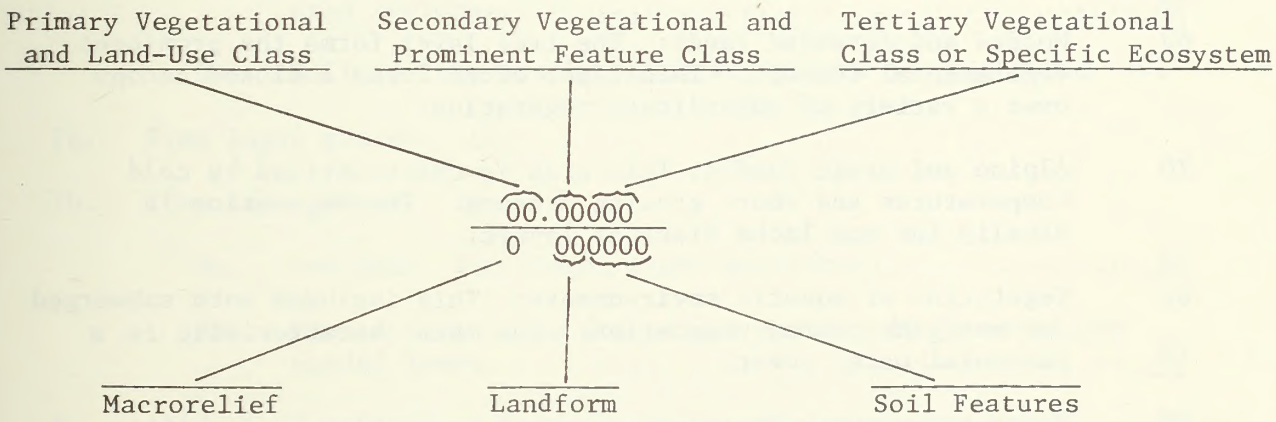
Vegetational Features

general _____ *specific*

Environmental Features

Specific Form:

Resource Classes Based on Vegetational Indicators



PRIMARY VEGETATIONAL AND LAND-USE LEGEND

Symbol	Physiognomic Type or Land Use
10	Barren Lands: The prominent features are bare mineral soils and/or rocks. Vegetation is lacking or so widely scattered that the general aspect is of a barren area
20	Deserts: These areas are typified by very sparse vegetation and are located in the more arid regions of the Southwestern U.S. and Northern Mexico.
30	Steppes: The herbaceous layer, including both perennial grasses and forbs, is usually prominent. Low to medium height shrubs are scattered or lacking except in some grazing disclimax situations -- notably among Great Basin shrub-steppe types.
40	Shrub/scrub lands: Medium to tall shrubs or small trees (scrub) are the prominent vegetation. These usually form a closed layer so that the herbaceous layer is completely subordinate. The herbaceous vegetation is highly variable but can be important.
50	Savannas: Dense stands of herbs or lichens overlain by scattered individuals of tall shrubs or trees.
60	Wooded and forested lands: The tree layer forms the prominent vegetational feature. This layer often forms a closed canopy over a variety of subordinate vegetation.
70	Alpine and artic Tundra: This area is characterized by cold temperatures and short growing seasons. The vegetation is usually low and lacks distinct layers.
80	Vegetation of aquatic environments: This includes both submerged and emergent rooted vegetation. The main characteristic is a perennial water cover.
90	Water resources: Rooted or emergent vegetation is lacking.
100	Agricultural lands: (See legend prepared by Bill Drager and Larry Pettinger, Forestry Remote Sensing Lab., Berkeley)
200	Urban and industrial lands: Those lands altered by man for living, manufacturing, and related activities.

KEY TO THE PRIMARY VEGETATIONAL AND LAND USE CLASSES

1a. Primary land use urban or industrial (including transportational facilities of mapable dimensions) 200

1b. Primary land use not urban or industrial (2)

2a. Agricultural lands excluding rangeland seedings.....100

2b. Natural areas, Not agricultural lands (3)

3a. Areas covered by water (4)

3b. Areas not covered by water (5)

4a. Aquatic environment with emergent vegetation..... 80

4b. Water resources without emergent vegetation..... 90

5a. Barren lands, vegetation absent or subordinate to exposed surfaces..... 10

5b. Areas with vegetation apparent (6)

6a. True deserts, prominent plants mostly scattered, arid regions..... 20

6b. Soil surface mostly obscured, plants not scattered (7)

7a. Tree layer present (8)

7b. Tree layer absent (9)

8a. Savannas, individual trees scattered..... 50

8b. Closed tree layer (trees not scattered) forested and wooded lands..... 60

9a. Alpine and artic tundra areas, short growing season..... 70

9b. Non-tundra areas (10)

10a. Scrub/Shrublands, shrubs most prominent vegetational feature, herbaceous layer sparse or obscured..... 40

10b. Steppes, Herbs and grasses important, shrub layer open or lacking..... 30

SYMBOLIC MAPPING LEGEND

BARREN LAND TYPES

Symbol	Type
10	Barren Land
11	Playas
11 1	Flats, Uninterrupted
11 2	Interspersed with Dunes
11 3	Interspersed with Occasional Vegetated Hummocks
12	Sand Dunes
13	Rockland
13 1	Bedrock Outcrops/Rimrocks
13 2	Boulder Fields
13 3	Glacial Detritus
13 4	Lava Flow
13 5	Rock Nets/Stripes
13 6	Talus/Colluvium
14	Upland Barrens (Ontterraces, plateaus, and undulating lands; not rockland)
14 1	"Badlands", Silty/Clayey
14 2	Land Slides/Fault Scarps/Erosional Escarpments
14 3	Slicks
14 4	Desert Pavements
14 41	Gravelly D.P.
14 42	Cobbley D.P.
15	Shorelines and Beaches
16	Made Lands (Raw land resulting from human activity)

16	1	Cuts and Fills, Non-mining
16	2	Mining Activity
16	3	Sanitation and Disposal Land Fills

(Vegetation types considered here were recognized in southern Arizona, Phoenix area)

1/ Types added for California Desert Inventory

20. Deserts (North American understood)

21. Microphyll desert generally with cacti

21.1 Larrea tridentata with few cacti and other shrubs except in drainageways or depressions. These types occur in the more arid portion of the desert in Arizona. They cover the bajadas and plains which may or may not also support other vegetation in the runnels. Shrubs are scattered, and bare ground area is high. Runnels extending far down the bajadas in the most arid regions seldom carry water to their distal ends from the desert mountains. Their distal ends may support little or no vegetation different from that on the interfluves. Closer to the mountain fronts other species including Cercidium microphyllum, Acacia greggii, Prosopis juliflora contribute to a richer vegetation type in the runnels in comparison to the interfluves.

21.11 Larrea tridentata in nearly pure stands, sometimes supporting annuals during favorable years.

21.12 Larrea tridentata, Franseria dumosa

21.13 Larrea tridentata, Franseria dumosa, Hilaria rigida

21.14 Larrea tridentata, Hilaria rigida

21.15 1/ Larrea tridentata, Fagonia chileinsis

21.16 1/ Larrea tridentata, Encelia farinosa

21.17 1/ Larrea tridentata, Ephodia, Coldenia

21.18 1/ Larrea tridentata, Ephedra

21.19 1/ Larrea tridentata, Ephedra, Prosopis juliflora

21.2 Franseria deltoidea, Cercidium microphyllum, Cereus giganteus often with Encelia farinosa. Opuntia (cholla) common

21.21 Encelia farinosa not present. Flora not rich as in 21.23 Larrea tridentata often prominent

21.22 Encelia farinosa present. Flora not rich as in 21.23

21.23 Flora rich with some or all of Simmondsia chinensis, Haplopappus larcifolius, Mimosa biuncifera.

21.3 Atriplex

21.31 Pure Atriplex

21.32 With Mesquite

21.4 Cactus aspect

21.41 Opuntia bigelovii clearly dominant

21.42 Opuntia (chollas) other than O. bigelovii dominant

21.5 Acacia constricta, Opuntia (prickly pear), Fouquieria

21.6 [1/] Encelia farinosa, Franseria dumosa

21.9 Flood plains and drainageways

21.91 Prosopis juliflora bosque (Prosopis is tree-like)

21.92 Tamarix

21.93 Atriplex

21.94 Cercidium floridum, Prosopis juliflora, and Olneya tesota [1/] with assorted shrubs that may be predominant

21.95 [1/] With Dalea spinosa

22. Microphyll-thorn scrub desert

22.1 Acacia vernicosa

22.11 Prosopis juliflora devoid of herbs

22.12 Larrea tridentata, Flourensia cernua

22.13 Mortonia scabrella

22.14 Rhus microphylla, Nolina microcarpa

22.15 Lippia wrightii, Fouquieria splendens

22.9 Flood plains and drainageways

22.91 Prosopis juliflora (Mesquite) bosque (Prosopis is tree-like)

30. Steppes - Herbaceous layer, including perennial grasses, usually prominent. Low to medium height shrubs (unlike the chaparral types) scattered or lacking except in some grazing disclimax situations -- notably among Great Basin shrub-steppe types.

31. Desert grassland

31.1 Grama grass steppe

31.2 Nolina and/or Yucca grassland

31.3 Mesquite with or without burroweed (Prosopis with or without Haplopappus tenuisectus) grassland

31.31 burroweed present

31.32 burroweed absent

31.4 Cactus/shrub grassland

31.8 [1/] Made environments

31.9 Bottomlands

31.91 Hilaria mutica - a nearly pure type

31.92 Sporobolus airoides

32. Salt desert shrub

33. Shrub steppe - Steppe in which scattered shrubs form a layer above the grasses.

34. True steppes or grasslands with forbs and shrubs generally obscure.

35. Meadows

40. Shrub/Scrub (make note of possible herbaceous vegetation)

41. Chaparral brushland. Shrub dominants include Adenostoma, Arctostaphylos, and Quercus. Branches are stiff. Herbaceous vegetation may be abundant. Climate is mild normally Mediterranean type.

41.1 Arizona chaparral

42. Mountain Brush - Scrub

42.1 Mountain Mahogany (Cercocarpus spp.)

50. Savannas. Dense stands of herbs or lichens overlain by scattered individuals of tall shrubs or trees.

51. Juniperus (juniper) grassland savanna

52. Quercus (oak) grassland savanna

60. Wooded and Forested Land

61. Pygmy forests and woodlands

61.1 Oak (Quercus) woodland

61.2 Juniper (Juniperus) woodland

61.3 Piñyon pine forest

61.4 Piñyon/Juniper woodland

61.5 Cypress/Piñyon woodland

61.6 Oak/Juniper

62. Sclerophyll (evergreen-broadleaf) forest

63. Conifer forest (excluding pygmy forest)

64. Conifer/Hardwood forest

65. Deciduous (broadleaf) forest

66. Tropical forest

69. Wooded drainages and floodplains

69.1 Populus/Platanus wrightii/Fraxinus

Ecologically Relevant Physical Features of the Landscape

LANDFORM FEATURES

Symbol	Ecologically Relevant Physical Feature
A	Bayous, Swamps. Tide-flats, and Deltas (vegetated)
B	Bottomland, undesignated or unclassified as to type
Ba	Stringer Bottom, narrow but not found in young, "V" shaped canyons and drainages
Bb	Valley Bottom; wide, including floodplains or "first Bottoms"
Bc 1/	Desert Washes
Bd	Basin, not seasonally ponded
Be	Basin, seasonally ponded
C	Alluvial deposits, fans and terraces
Ca	Bajadas and Fans
Cb	Terraces
Cc	River
Cd	Lake
Ce	Marine
Cf	Alluvial plains
D	Level to Rolling Uplands, Benches, Mesas, and Plateaus
E	Dunes, Sandhills, or Beachridges
Ea 1/	Active Dunes (high)
Eb 1/	Low Rolling Dunes
Ec 1/	Flat Sand
Ed 1/	Striated Stable Dunes
F	Slopes--Ecologically significant by virtue of a change in vegetation and/or soil with the change in slope

Fe Exposed slopes (to prevailing winds and insolation, normally NW, N, NE and sometimes E aspect in northern hemisphere, opposite in southern hemisphere)

Fp Protected slopes (from prevailing winds and insolation, normally NW, N, NE and sometimes E aspect in northern hemisphere, opposite in southern hemisphere)

If slopes are ecologically steep in that they support a different vegetation with the ecotone corresponding to the slope change from moderate to steep, add a designator "s" to the symbol (e.g., Fes = Exposed steep slope)

G Patterned Ground

Ga Biscuitland Complex

Gb Ridge-Swale Complex

Gc Pittedland Complex

H Scabland and/or Rockland; vegetated, not barren

Hd On Relevant Landform Feature "D"

Hf On Relevant Landform Feature "F"

I Ridge-top, convex portion of ridge above tangent with slope regardless of relative elevation; supports unique vegetation with ecotone more or less at point of tangency; ridge not broad enough to form class "D" feature

J Canyon, Ravine or Arroyo; narrow and deep, young erosionally "V" shaped except arroyos in some soils where they are narrow, vertically sided and "U" shaped.

On Relevant Physical Features "C", "E", and "F", position on slope may be relevant and of ecological significance. When so, as indicated by a change in image characteristics or in vegetation or soils, indicate by subscript "u", "c", and "l" to designate upper 1/3, center 1/3, and lower 1/3 of slope.

Microrelief Classes

Classes	Description
1	A generally flat landscape with prominent slopes less than 10%
a	The landscape is essentially smooth. Dissection is minimal. The regional slope in this class is nearly always between 0 and 3%.
b	The landscape is relatively flat; however, dissection has progressed to a noticeable point. Dissection is either sharp and widely spaced (in which case side slopes may be over 10%), or gently rolling and more closely spaced. Where side slopes exceed 10%, microrelief is generally less than 10%.
2	A rolling or moderately dissected landscape with prominent slopes 10% to 25% (side slopes may exceed that figure in the case of dissected planar surfaces).
a	The landscape is rolling or gently hilly; a regional slope is not readily apparent - or - a regional slope of 10% to 25% is present.
b	The landscape consists of a moderately to strongly dissected planar surface (i.e. pediment, bajada, valley fill, etc.). The regional slope is generally between 2% and 6%; side slopes must be steeper than 10%. If side slopes are steeper than 25%, relief must be less than 100 feet. The drainage network is finer than that of 1 b.
3	The landscape is hilly to submountainous; slopes are moderate to steep, predominantly exceeding 25%. Relief is generally over 100 feet but less than 1000 feet. Where relief approaches 1000 feet, the landform system appears to be relatively simple - with smooth slopes. Drainage systems generally have the same base level.
4	The landscape is mountainous, having high relief, usually over 1000 feet. Slopes are moderate to steep, frequently exceeding 50%. The landform and drainage systems are usually complex, with drainage networks having base levels quite independent of one another.

SYMBOLIC MAPPING LEGEND

URBAN AND INDUSTRIAL LANDS

Symbol	Type of Urban or Industrial Land
200	Urban and Industrial Lands (including transportational facilities of mapable dimensions)
210	Cities and Megalopolis
211	Business Districts and Shopping Centers
212	Old Urban Residence
213	New Urban Residence
214	Small-acreage Suburban Residence
215	Developing Subdivisions and Small-acreage Suburbia
220	Towns and Villages
230	Industrial and Manufacturing
290	Transportation Developments (Surface)
291	Navigable Rivers and Canals
292	Major Freeways, Multiple-lane
293	Hard Surfaced Highways, 2/3-lane
294	Unsurfaced roads, graded
295	Unsurfaced roads, ungraded
296	Railroads
297	Airports, Runways, and Military Air Bases

NOTE: Ability to use the designators in Class 290 obviously depends on the scale and resolution of the imaging system

SYMBOLIC MAPPING LEGEND

PRIMARY VEGETATIONAL AND LAND-USE LEGEND

WATER RESOURCES LEGEND

Symbol	Type of Water Resource
90	Water Resources (Free water surfaces of mapable size)
91	Lakes and Ponds
91 1	Natural
91 2	Artificial/Enlarged
92	Water Courses, Permanent
92 1	Rivers and Creeks
92 2	Canals and Ditches
93	Bays and Estuaries
94	Oceans and Seas

Soils Legend

Soils range from very shallow to very deep, coarse (light) to fine (heavy) textured, slightly to moderately alkaline (saline), calcareous, and rock-strewn or rock-free.

Depth and texture of surface soil

1. Deep, light or coarse textured. Over 30" of loamy sand or sand.

2. Moderately deep, coarse textured. 16" - 30" of loamy sand or sand. Depth limitation is bedrock or cemented pan.

3. Shallow, coarse textured. Less than 16" to bedrock or hardpan.

4. Deep, medium textured. Over 30" of sandy loam, silt loam or sandy clay loam.

5. Moderately deep, medium textured. 16" - 30" to bedrock or hardpan.

6. Shallow, medium textured. Less than 16" to bedrock or hardpan.

7. Deep, fine textured. Over 30" of clay loam, silty clay loam, silty clay, sandy clay silt, or clay.

8. Moderately deep, fine textured. 16" - 30" to bedrock or hardpan.

9. Shallow, fine textured. Less than 16" to bedrock or hardpan.

Gravel or rock

1. No appreciable (20-40%) gravel over 1/4" diam. on rock air surface or in soil profile.

2. Gravel 1/4" - 3" diam. present covering more than 60% of soil surface and abundant in soil profile.

3. Gravel 1/4" - 3" diam. present covering more than 60% of soil surface but none in soil profile.

4. Small rock 3" - 6" diam. present covering more than 60% of soil surface and abundant in soil profile.

5. Small rock 3" - 6" diam. present covering more than 60% of soil surface but not in soil profile.

6. Rock and cobbles 6" - 24" present covering more than 60% of soil surface and abundant in soil profile.

7. Rock and cobbles 6" - 24" present covering more than 60% of surface but not in soil profile.

8. Rock outcrop dominant

9. 20% to 40% rock or gravel on surface and/or in soil profile.

Parent Materials Legend

00 Unconsolidated alluvium

10 Coarse-grained igneous (plutonics)

11 acid "

12 intermediate "

13 basic "

20 Fine-grained igneous (volcanic, including tuffs, agglomerates, pyroclastics, as well as flows, shallow-seated dikes and sills)

21 acid "

22 intermediate "

23 basic "

30 Sedimentary rock

31 conglomerate

32 breccia

33 sandstone

34 siltstone

35 shale

36 limestone-dolomite

37 gypsum, anhydrite

38 rock salt (halite)

40 Metamorphic rock

41 quartzite

42 gneiss

43 schist

44 phyllite-slate

45 marble

46 serpentine-talc-soapstone

Giving 23 types of rocks, 264 possible pairs. If two predominant types are to be listed, requires 4-digit system (1 1 4 3 would be predominantly acid igneous rock and schist). There isn't room between 46-99 to list 264 combinations.

APPENDIX C

WAY STATION REPORT

INTRODUCTION

The California Desert Way Stations and Visitor Center report is a far reaching proposal for recreation Management in the Southeast desert area of California.

The development of this report has necessitated many meetings, conferences and field trips to the Study Area. Information supplied by other federal agencies, State and Local Governments represent necessary contributions and interest of those involved. A review Committee formed of personnel from the National Park Service, United States Forest Service, Pacific Southwest Forest and Range Experiment Station and the Bureau of Land Management gave freely of their valuable time in shaping this final report.

A NEW CONCEPT IN OUTDOOR RECREATION ----------
CALIFORNIA DESERT WAY STATIONS AND VISITOR CENTER

I. Overview

II. Problem Analysis

a. Needs

b. Concept

Way Stations

Desert Center

c. What we want to Accomplish and Have

1. Management of People

2. Education

3. Recreation

4. Protection

III. Recommendations

Way Stations

Desert Center

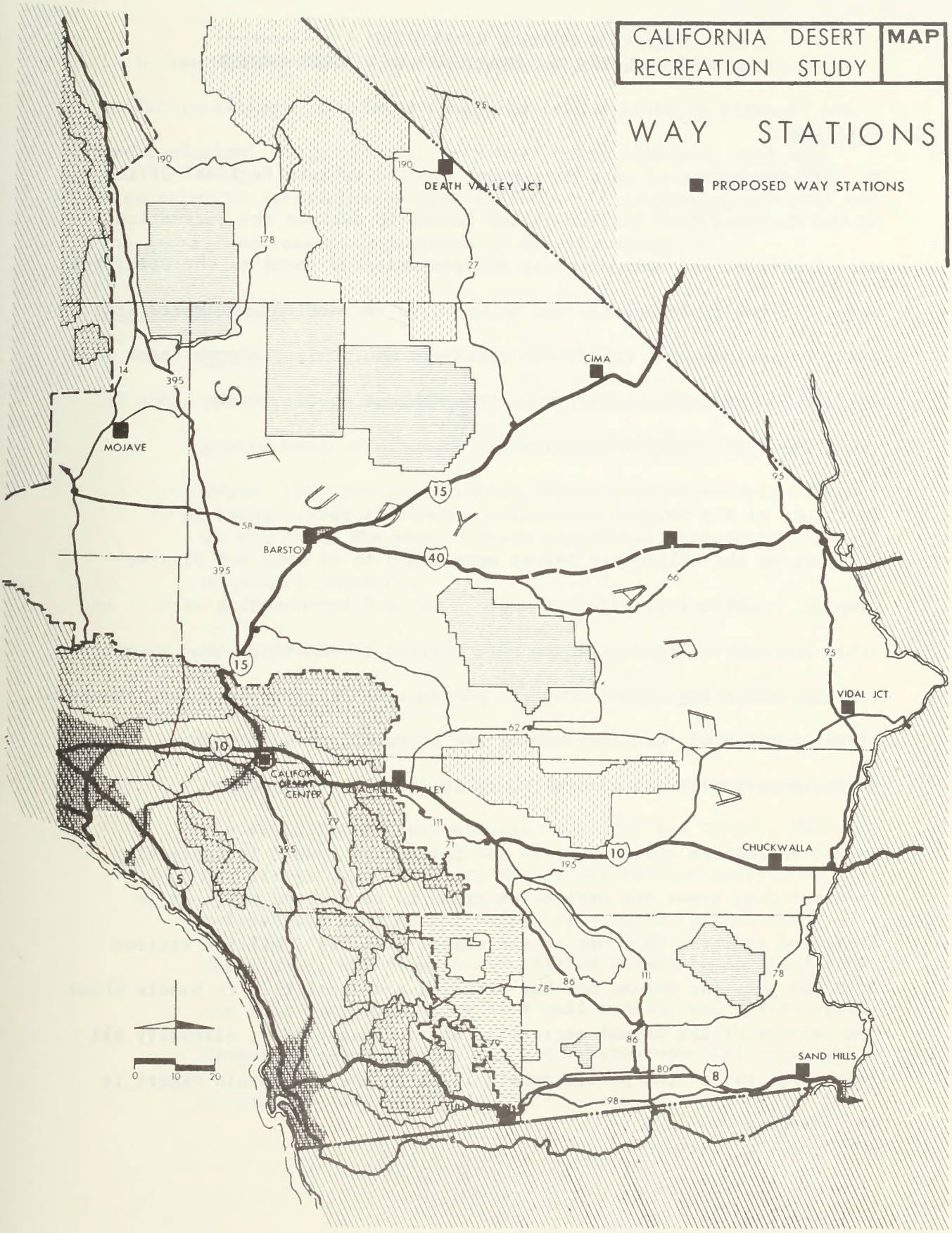
a. Location and Priority

b. Staffing and Management needs

c. Design Theme

d. Construction Estimates

IV. Alternative Solution


CALIFORNIA DESERT RECREATION STUDY
MAP
WAY STATIONS
PROPOSED WAY STATIONS
DEATH VALLEY JCT.
CIMA
MOJAVE
BARSTOW
VIDAL JCT.
CHUCKWALLA
SAND HILLS
CALIFORNIA DESERT CENTER
STUDY AREA
0 10 20

A NEW CONCEPT IN OUTDOOR RECREATION ----------
CALIFORNIA DESERT WAY STATIONS AND VISITOR CENTER

I. Overview

In 1968 the Bureau of Land Management and the Western Regional Office of the National Park Service joined forces to analyze the recreation use, resources and management of BLM administered lands in the California Desert. From field surveys and accumulated recreation statistics, the study determined that California residents and their visitors spent an estimated 5 million recreation visitor days on public domain lands in the California Desert during 1968.

The study of the outdoor recreation activities participated in by visitors to the California Desert were found to be many and diverse--camping, sightseeing, off-road vehicle use and rockhounding were -- and still are some of the more common pursuits. In addition, sand chariot sailing, observing desert flowers, photography, scenery painting, mountain climbing, fishing, hunting, hiking and horseback riding are some of the specialized recreation activities taking place in the desert.

Annual recreation visitor use on the California Desert is increasing at about five times the nationwide trend in recreation use. It is estimated that the 1970 use on the desert area was 7 million visitor days and yet, the Bureau now has staffing and facilities to handle about one percent of the annual recreation use. Consequently, virtually all recreation use of the public domain lands in the California Desert is now unregulated.

It is easy to see then, why the environment of the California Desert is deteriorating. Extensive damage is taking place on historic and archaeological sites, scenic vistas are being affected, soil and vegetation is sustaining damage, pollution is permeating the area and the general recreation experience is deteriorating.

II. Problem Analysis

a. Needs

The Bureau of Land Management has responsibility for the public lands which make up the majority of the California Desert area and the visitors that use these lands. Unless we act soon, the Desert faces damage and destruction because of people pressure.

In spite of the present substantial visitation to the California Desert, by and large, general public attention has not been drawn to the responsibilities of BLM and the inherent values of the desert Public Domain lands, including the diversity of recreational opportunities there. BLM has little opportunity to assist the visitor on-site or protect the environment mainly because the agency lacks facilities, buildings and qualified personnel in the desert for this purpose. There is a real public need for a desert oriented information system and an environmental conservation program on desert values.

b. Concept

The present lack of public contact and a public information system reflects the BLM's custodial role of the past. This role included little involvement in managing people. However, the demand for management of public domain lands for recreation and other people uses has drastically changed all this. BLM needs new "tools" to handle its new responsibilities. One of these new "tools" could very well be the development of a system of Way Stations, located strategically in the California Desert, together with a major Visitor Center, located in proximity to the major urban centers of southern California. These structures could provide services for information, education, medical first aid, communications, direction and interpretive services for the public and where necessary, operating facilities for the Bureau of Land Management.

Present key elements in this concept that are important are:

1. Inherent values of the desert made known to the public.
2. User assistance offered.
3. Desert features interpreted.
4. Environmental conservation program defined.
5. Management and administrative structure completed.
6. Recreational use data acquired.

It is possible that this concept could well be applied throughout the west and Alaska where BLM has extensive public lands.

Way Stations:

The Way Stations would be located according to use opportunities and management objectives. In most instances location would be keyed to primary or interstate highways in the California Desert, and generally in the proximity of major intersections such as indicated on the Map, page 1. Each way station would be located with respect to the characteristics of the area it serves and to the needs and objectives of the total desert system.

The type and quality of services available at a way station should reflect the needs of the recreationists in relation to the recreation experience afforded by the surrounding lands as well as the administrative needs of the BLM for that particular area. Therefore, the appropriate Way Station at any given location should vary in size and design from one location to another.

Desert Center:

The Desert Center would be a special purpose facility to serve the major population areas immediately to the west of the California Desert, which exert a tremendous influence on desert use. These areas are the principal source of the increasing number of recreationists using the desert. It is important to reach these people, to inform them of the diverse recreation opportunities on the desert and to alert them to the hazards there, while at the same time, educating them to the

natural values and resources of the area. To best accomplish this, the Desert Center could for example be located in an area such as the intersection of Interstates 10 and 15 between the cities of San Bernardino and Riverside. This type of location would be convenient to both cities as well as to the larger Los Angeles metropolitan area. However, the specific location of the Desert Center should be selected only after experience is developed from the operation of the initial Way Stations, and upon the completion of a feasibility study considering cultural, social, economic and related needs for such a facility.

c. What We Want to Accomplish and How

1. Management of People: For their enjoyment and safety, and for the protection of the irreplaceable resources of the desert, people need information and guidance. The system of Way Stations and the Desert Center would provide this service by making available maps, exhibits, information on rules and regulations and trained specialists responsible for visitor movements in the desert.

2. Education: The California Desert offers a remarkable opportunity to the people to learn about this land in which they live. As part of an overall system of teaching conservation and man's relationship to his human

and natural environment - the system of Way Stations and the Desert Center would be invaluable in assisting in this program by having exhibits and material showing animal, bird and plant life in the desert along with information on artifacts, fossils, desert ecology, history and other germane subjects of general interest.

3. Recreation: The first phase of the California Desert Study pointed out that the Desert has the physical size and natural attributes essential to satisfy future recreation demands. Nineteen recreational areas were identified having exceptional recreational values and additional areas have been identified since this first study. It is the Bureau's aim to inform the public about these areas and the total recreation use of the Desert. The development of a network of communication facilities built into the Way Stations and the Desert Center providing for; recreation reservations; insuring of public safety; facilitating proper management of people and resources -- would be beneficial in seeing that recreational values are not impaired or destroyed.

The proposed system of Way Stations and the Visitor Center could contain large relief maps of the desert region with brochures on specific areas to inform the recreation user. This system manned with Bureau trained specialists could provide the services necessary to manage the ever increasing recreation use of the desert.

4. Protection: The California Desert has been described as fragile. This applies not only to its ecology but also to the people who use it. The system of Way Stations and the Desert Center coupled with proper staffing could provide the desert visitor with the necessary information concerning strengths and limitations of resource production and a basic land appreciation. There is also a need to inform the user of the desert climate - survival is only a matter of minutes from excessive heat and a shortage of water. Also physical hazards need to be made known to the public.

III. Recommendations

It is recommended that a system of Way Stations and a Desert Center be developed as shown below. These facilities are presented schematically on page 10.

Way Stations:

The facilities developed by BLM at a Way Station could include a part or all of the following:

Off-road parking and sanitary facilities.

Drinking water and trash receptacles.

Wayside picnic and camping facilities.

Sanitary dump station - for self contained vehicles and trailers.

Recreation and Administrative Airstrips.

A building providing space for:

1) Public informational needs - display of map, brochure handouts and other pertinent information showing location of recreation opportunities.

2) Interpretive exhibits - exhibits to display desert values and opportunities within the area served by a particular Way Station.

3) BLM staffing, such as a receptionist, rangers and in some instances facilities and staffing for Area Manager's Offices.

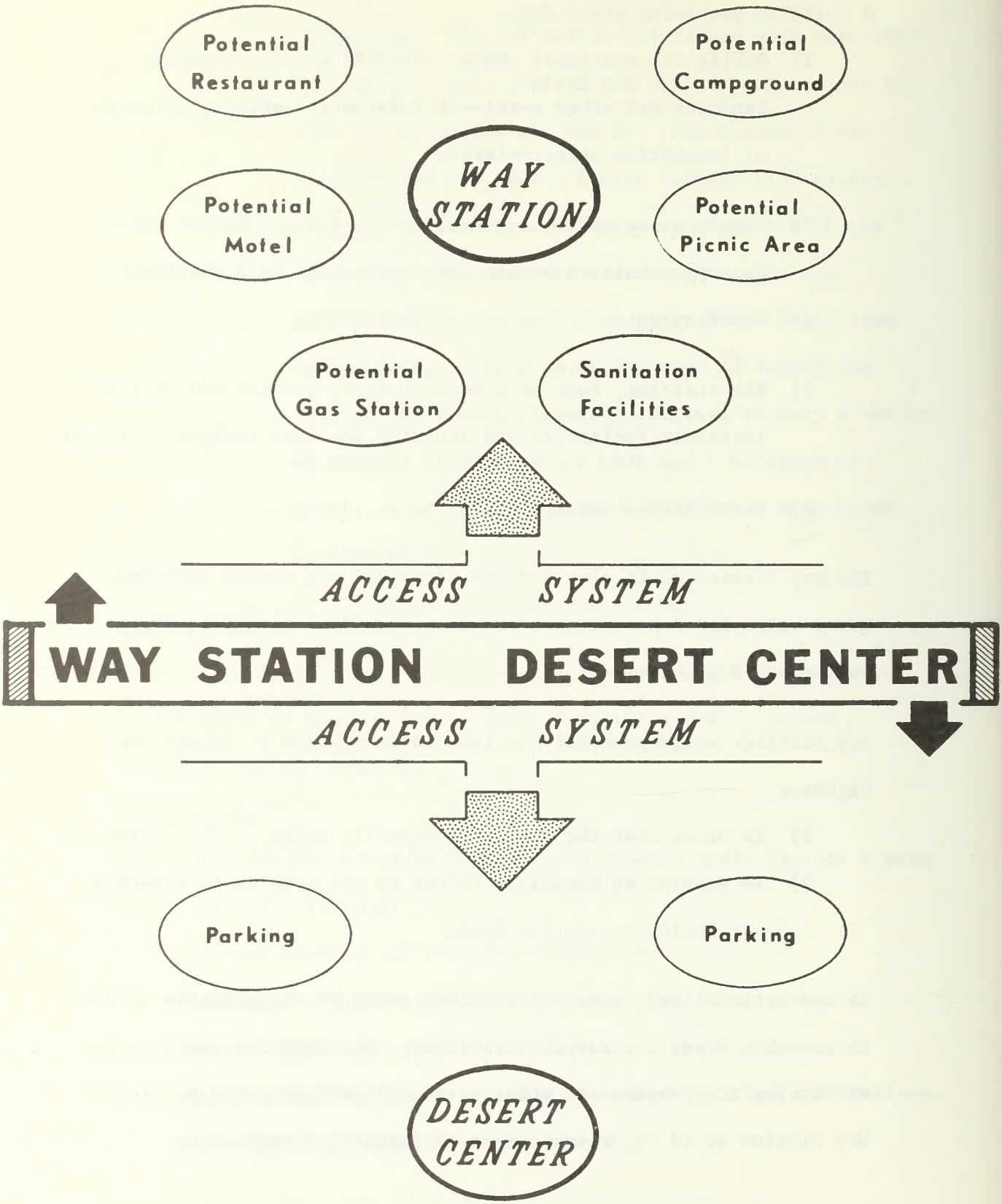
4) Communication equipment.

The Way Station would also include first aid and rescue services, broad communication equipment and emergency "on call" provisions during off-duty hours.

Way Stations would generally be located near major or interstate highways:

1) In order that the public is visually aware of their presence.
2) To provide an immediate filter to the user as he enters a particular recreation area.

As conceptionalized, most Way Stations would be conveniently located as possible bases for ranger activities. The need for and location of housing for rangers and other personnel assigned to a particular Way Station would be determined on the merits of each case.


Potential Restaurant
Potential Campground
WAY STATION
Potential Motel
Potential Picnic Area
Potential Gas Station
Sanitation Facilities
ACCESS SYSTEM
WAY STATION DESERT CENTER
ACCESS SYSTEM
Parking
Parking
DESERT CENTER

Desert Center:

The Desert Center in concept would be an attractive building containing a large relief map of the desert region as well as exhibits, showing animals, birds, plant life, artifacts, fossils, etc. It would otherwise explain the geological features, the fragility of the desert, its ecology, history and other germane subjects of general interest. An extensive selection of informational materials and brochures would also be available to the public there. The Center would perform another very important service as the hub of a desert environmental conservation program for schools and youth groups. In addition to this role as a visitor information and education center, the facility could include 1) Automatic data processing equipment that when used in conjunction with trained specialists would be useful in analyzing visitor movements and concentrations in the desert and thus move field rangers to sensitive areas of visitor need and resource protection. 2) Communication equipment tied to the desert Way Stations and field vehicles for fast response to developing situations. 3) Visitor protection specialists who would respond to the health and safety needs of the general public.

Prior to site acquisition and survey and design, a detailed feasibility study should be developed to show (1) Location, (2) Participating Agencies, staffing needs and size of structure needed.

a. Location and Priority:

The area location of the Way Stations is indicated on the enclosed map, (page 1). Location was determined by these factors: (1) central location in relation to the recreation area being served and (2) location of major arteries as they relate to the recreation area and (3) suitability for psychological access to an area offering particular recreation experiences.

The priority for development considers various factors - such as (1) need - high visitation estimates, (2) land status - under present public ownership or to be acquired, (3) available utilities - water potential, power and telephone availability, radio communication capability, (4) access to adjacent recreation lands, (5) topography and scenic attractions of the site, and (6) potential for sustaining or enhancing the resource integrity and the resource based experience of the public using the area.

Applying the above factors, it was determined that the first Way Station development sites should be selected from the following list: These locations are shown on the Map, page 1, of this report.

Barstow	Mojave
Yuha Desert	Sand Hills
Cima Dome	Coachella

In view of the existing information available to the Bureau and the management analysis that has been accomplished to date, the Barstow site has top priority for development because of people and resource needs. High priority for development is also associated with the

Cima, Yuha and Mojave sites, however, it is possible that in this dynamic area of California, events could lead to a reshuffle of priorities to take advantage of changing situations - such as location of new interchanges, cooperative agreements between agencies, etc.

Additional Way Stations and the Visitor Center should be programmed for development after the first two or three Way Stations have been in operation. This will allow for an analysis of their operation and modifications in exhibits or programs that might be necessary.

b. Staffing and Management Needs:

A major mission of all Way Stations will be to provide information - where to go, what to do, etc. The second major mission is the protection and/or direction of the users. This requires dispatchers, interpreters, rangers and possibly law enforcement officers.

Certain functions of the Way Stations will differ - for example - stations in areas involving heavy loads of visitors might be oriented primarily toward "control of people". Those further out could be oriented toward service - i.e. direction, assistance and protection. All of the stations would be involved in much the same functions, but the degree could vary considerably. Unless unusual circumstances indicate otherwise, the respective Area Manager is responsible for the management of Way Stations in his Resource Area.

Where practical and logical BLM field management offices should be incorporated into the Way Station facilities. This would facilitate

public contact and avoid undo confusion. The following is the anticipated staffing requirements of a Way Station such as located at Barstow and are in addition to the Area Managers normal complement.

1	Station Master (Natural Resource Specialist)	This person reports directly to the Area Manager.
2	Clerks	Reception specialist and duties of a dispatcher.
1	Dispatcher	In communication with field staffs.
2-5	Natural Resource Specialists	Field resource specialists (non uniformed).

The Natural Resource Specialists would have the following duties:

1. Assist visitors
2. Observe and inventory
3. Resource management related to recreation use.
4. Be trained to handle emergency conditions - would not be designated peace officers.
5. At least 2 positions would have training in interpretive services.

1	Outdoor Recreation Planner	Recreation specialist for the area.
5	Rangers	At the start these would be mainly resource management oriented - at the end of a five year phasing period they would be almost totally involved with the management of people and the enforcement of rules and regulations.

As the need warrants, this initial force could be expanded to include the following:

1. Full time electronic technician.
2. Maintenance personnel.
3. Full time interpretive specialist.

c. Design Theme:

Each Way Station should be designed to visually reflect the area in which it is located. Each station should be considered as a unit which reflects the needs of the total system. For example, facilities and services for the Imperial Dunes area would be quite different from those serving the Barstow area.

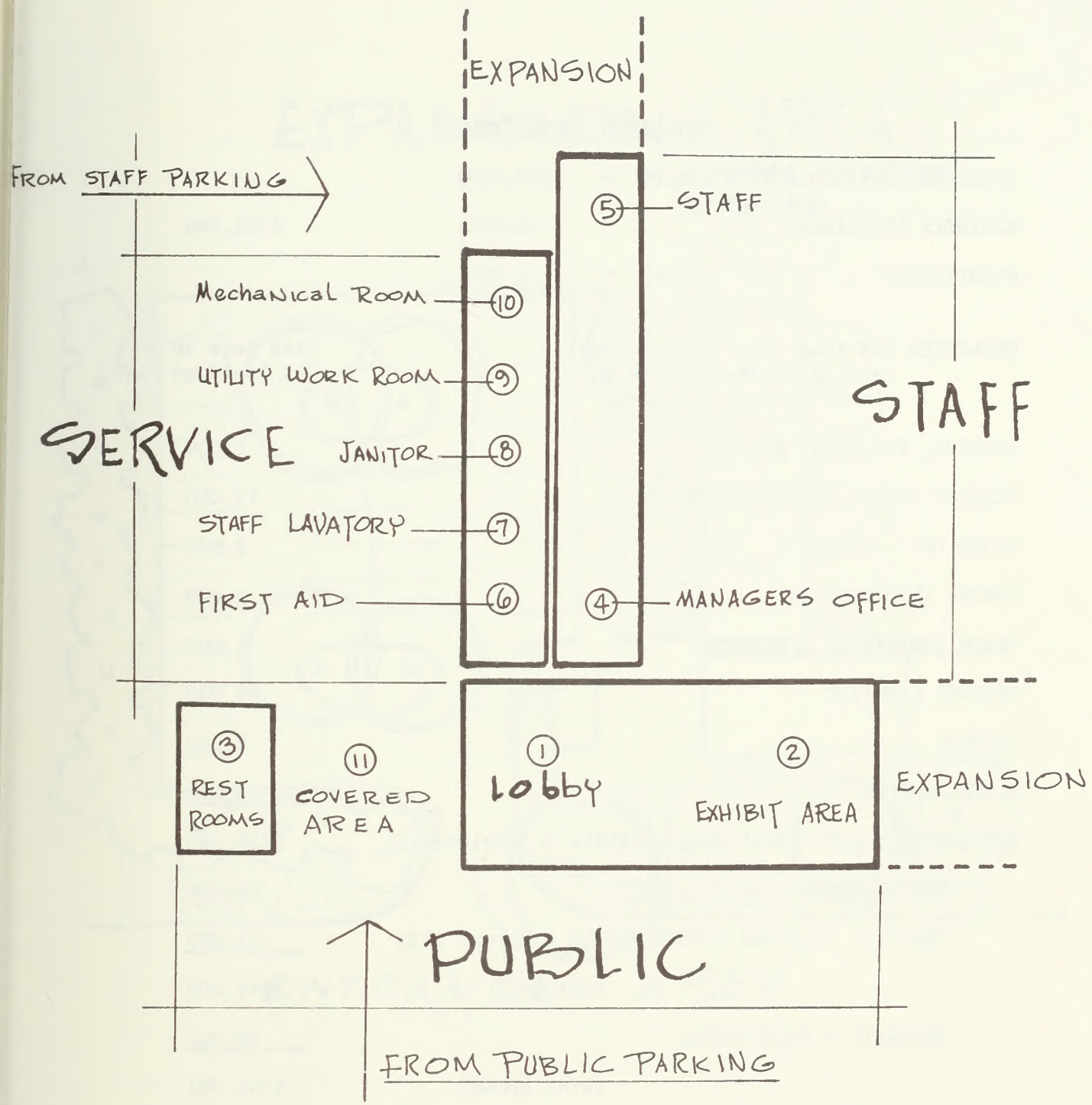
This will allow the visitor to relate his initial desert contact to this later experience within the recreational area.

d. Construction Estimate:

The following pages contain space requirements, sketches, cost estimates and timing schedule for the development of a typical Way Station.

SPACE REQUIREMENTS

No.	Item	Sq.Ft.	Sub-Total	Total	Remarks
	PUBLIC AREA				
1.	Lobby & Info.	1,000			
2.	Exhibit Area	600			
3.	Rest Rooms	350	1,950	1,950	Size equal to NPS std 11-fixture comfort station
	STAFF AREA				
4.	Manager's Unit				
	a. Manager Office	150			Individual areas follow GSA recommended office space standards.
	b. Clerk Office	100			
	c. 2-N.R. Specialist Off.	150			
	Add 20% circulation	80	480		
5.	Staff Unit				
	a. Clerk Office	100			
	b. Dispatcher Office	100			
	c. 8-N.R. Specialists Off.	400			
	Add 20% circulation	120	720	1,200	
	SERVICE AREA				
6.	First Aid Room	150			Size includes 2-fixture lavatory.
7.	Staff Lavatory	75			
8.	Janitor & Supplies	75			
9.	Utility-Work Room	200			Equipment to include sink & cabinet & floor drain.
10.	Mechanical Room	300			
	Add 20% circulation	150	950	950	
	TOTAL ENCLOSED AREA			4,100	
11.	Covered Area (Porches, etc.)	1,000		500	½ full value for estimating
				4,600	S.F.



PLAN DIAGRAM

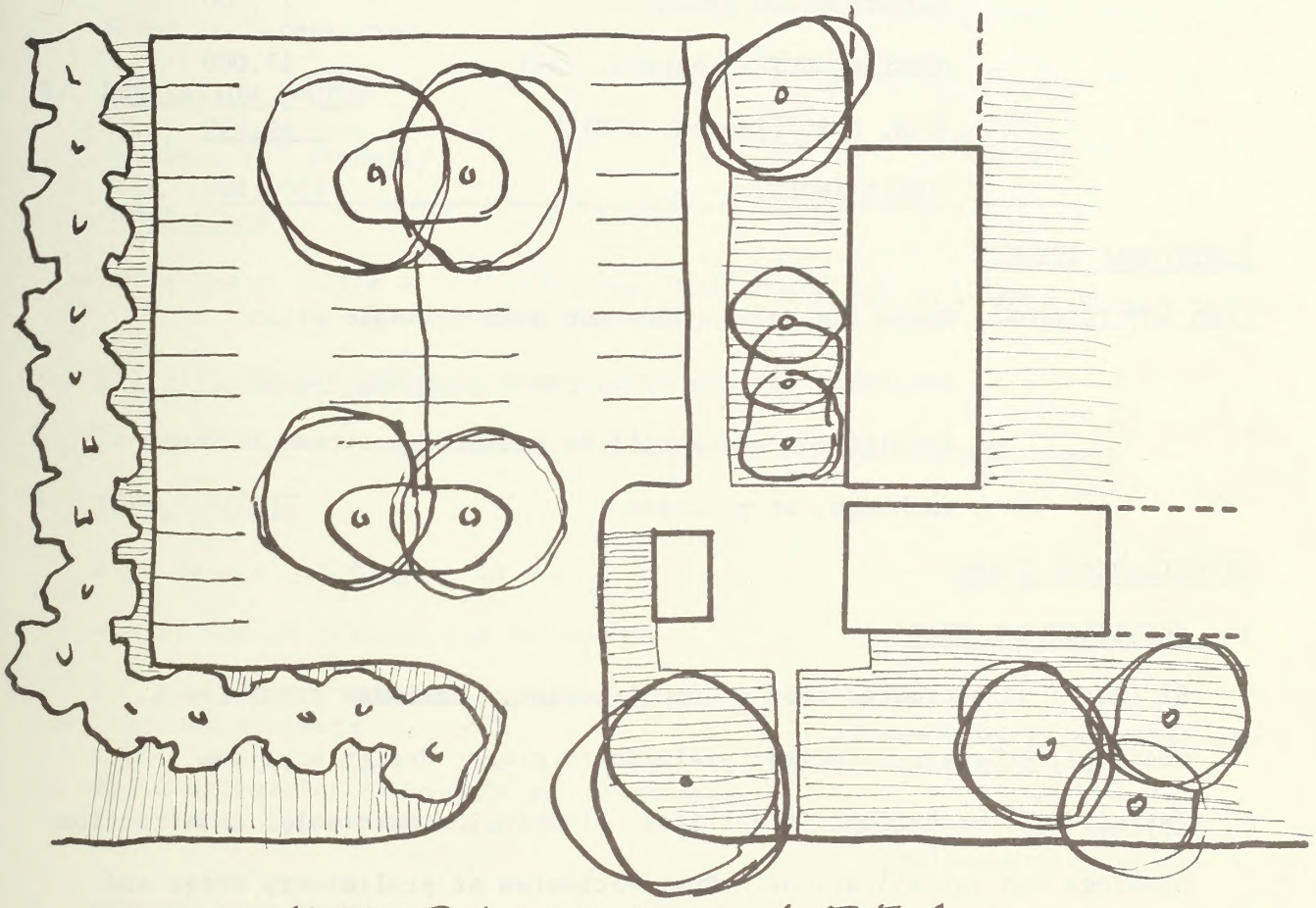
WAY STATION - BASIC CONCEPT

ESTIMATED COSTS (ROUGH)

BUILDING = 4,600 S.F. @ $40.00	=	$184,000)	
EXHIBITS (Flexible)	=	40,000)	$184,000
FURNISHINGS	=	10,000)	
		$234,000	
UTILITIES (In some cases connections will probably be made to local systems.)			(see page 20 - not included here)
GRADING, PLANTING, ETC.			5,000
PARKING AREA - BITUMINOUS PAVING			13,000
SIDEWALKS - CONCRETE			5,000
FENCES (If required)			5,000
TRASH CONTAINERS & BENCHES			1,000
OUTDOOR LIGHTING			4,000
SIGNING			2,000
MISCELLANEOUS			1,000
CONSTRUCTION COST (Excluding exhibits & furnishings)			$220,000
CONTINGENCIES (Approx. 15%)			33,000
PLANNING SERVICES & SUPERVISION (Approx. 19%)			42,000
		SUBTOTAL	$295,000
EXHIBITS & FURNISHINGS			50,000
		TOTAL AMOUNT	$345,000

EXPANSION AREA

OUTDOOR STORAGE
PARKING



ENTRANCE AREA

LANDSCAPE DEVELOPMENT

UTILITIES - (Where Required)	
SEWAGE DISPOSAL	$ 15,000
WATER (Well, Pressure System and Treatment and Fire Protection)	35,000
POWER, INCLUDING GENERATOR BUILDING	25,000
CONSTRUCTION AMOUNT	75,000
CONTINGENCIES (Approx. 15%)	11,000
P.S. & S. (Approx. 19%)	14,000
TOTAL AMOUNT	$100,000

ADDITIONAL ITEMS

LAND ACQUISITION - Where the Bureau does not have suitable sites available for the development of a Way Station, acquisition costs will be necessary, either through exchange, or purchase.

MISCELLANEOUS ITEMS

1. ARCHITECTURAL FEES

6% (Max.) of estimated cost of construction. Includes predesign meetings; schematic studies; preliminary plans; design analyses (structural, mechanical, electrical, plumbing, acoustical); construction drawings and specifications. Cost estimates at preliminary stage and final cost estimate when construction drawings and specifications are submitted.

Also includes review of all shop drawing submittals and consultative services, but not inspection.

Can set up A/E contract to include costs per man/day for inspection services as required by Contracting Officer.

2. TESTING OF MATERIALS

Where required, can be incorporated in A/E contract. (1-2% of contract).

3. INSPECTION

Approximately 8% of construction costs.

4. CONTINGENCIES

Shown in "breakdown".

5. ESCALATION FACTOR

Averages 7½% annually.

6. OTHER COSTS

Soils Tests - Site Planning include with A/E's contract (as a change order). 2-4% of contract costs.

7. OFF-SITE SPACE REQUIREMENTS

Each Way Station would need to be analyzed for its specific needs.

8. TIME SCHEDULE

From date of signing up an A/E:

a. Predesign meeting and schematics	1 month
b. Preliminary drawings, design analyses, cost estimate	6 weeks after approval of schematics
c. Construction drawings, specifications, final cost estimate, etc.	3 months after approval of preliminary drawings

9. MINIMUM TIME PERIOD

From Predesign Meeting to completion and submittal of Construction drawings, Specifications, Estimates, etc.: assuming no undue delays. Approximately 7 months

10. ADVERTISING AND BIDDING

(one month bidding time) 6 weeks

11. REVIEW, APPROVAL AND AWARD OF CONTRACT 3 weeks

12. CONSTRUCTION TIME LIMIT 270 days (9 months)

IV. ALTERNATIVE SOLUTION

The Way Station concept was born of an idea - an idea that visualizes broad contact with the visiting public while keeping management costs low. Traditional recreation site development is not the answer in the California Desert - nor do the majority of the desert visitors want this "historical" approach to their needs and desires.

An alternative might be that we promote long-range planning by putting the initial Way Station development into a context of a "planning demonstration". The Bureau has not demonstrated that development at this stage is part of the planning process rather than plan implementation. For instance, we don't know how people will respond to a Way Station system except as we compare it with other I & E and Interpretive Programs. Location theory within our present recreation system is somewhat sketchy and is based mostly on professional judgment at this point. We are dealing with a resource which has unique features and uses - super-imposed upon traditional uses and users. It may be that the entire Way Station concept will require unique approaches to achieve management objectives. It is visualized that a series of I & E facilities could be remote controlled from the Desert Center. Each of these units would be keyed to resource and use patterns and would provide information on

conditions within a particular sub-system. This is just an idea but it might be feasible. Ideas like this should be explored as part of our Planning Process.

An alternative to the concept of full development of the Way Stations would be to use the first Way Station sites selected as test sites. "Mobile Home" units (office and display trailers) could be acquired, water and sanitation provided, along with adequate parking developed to test the effectiveness of the concepts. Possibly everything could be portable. While this procedure would allow more time for planning studies concerning user behavior and circulation patterns it was discarded because of the "Long range" higher costs involved. It was felt that the replacement costs of temporary facilities would far outweigh possible future modification costs to the initial Way Stations that are proposed in this report.

APPENDIX D

PROTECTION REPORT

CALIFORNIA DESERT PROTECTION

The Problem: I. Crime, Hazard and Damage Increase on the Public Domain

Remote areas in the California Desert which a decade ago were considered too hazardous for casual travel are becoming playgrounds for the city multitudes. Several factors contribute to the rapid change: more people, increased leisure, more money for non-essentials, better highways and mass production of recreation vehicles.

The residents of Southern California's cities have found a relatively easy way to escape to a place that has clean air to breathe, wide vistas to drain off tensions and elbow room to pursue new hobbies. They also like the atmosphere of fewer social restrictions.

At the latest count--in 1968--enough of them went to the California Desert to add up to five million visitor days of recreation use. The great majority of the multitude saw the desert, enjoyed it and did nothing to its detriment or to harm other visitors.

But a substantial number of visitors took their anti-social attitudes from the city to the desert. In 1968 on lands administered by the Bureau of Land Management in the California Desert, there were an estimated 490 major crimes such as larceny, aggravated assaults, narcotics violations, car clouts and robberies. There were also an estimated 1,280 lesser offenses against people and property.

For the most part, the Bureau of Land Management could do little more about these crimes than write reports. It does not have the manpower or authority to do more. Other law enforcement agencies--local, state and

federal--stretched as far as they could to help, but often they were too thinly manned to do much. The great influx of people and the criminal activity made it evident that BLM's traditional role had been changed. No longer would the prime mission be the protection of natural resources from misuse and overuse. Now it would be necessary also to protect the influx from natural hazards and, occasionally, from each other. And it would be necessary to increase the protection of government property.

Vandalism was--and is--rampant. Some examples: shelves and deodorizers torn off the walls of outbuildings, toilet doors bashed in, registration stands torn apart, campground waters purposely polluted, fences cut, bird-watering guzzlers broken, petroglyphs dynamited, log barriers at camp sites uprooted, water tank spigots deliberately left open to drain tanks , and burning of signs, garbage can anchor posts, toilets, picnic tables, palm trees, Joshua trees, and grass and brush land.

There is the illegal shooting of signs, garbage cans, water tanks, wind-mills, toilet doors, gates and locks, developed wells and springs,pictographs and petroglyphs, livestock and wildlife. It is hard to find a BLM sign without bullet holes within a month of its placement.

One outhouse was blown up. At one campground all of the toilet paper was taken. Thieves took picnic tables, padlocks, garbage cans, campground coin boxes, registration signs, imbedded steel fence posts, camp grills, protected fossils, historic artifacts, decorative stone, mining equipment, Christmas trees, sleeping bags, ice chests...

Recreationists and land managers are bewildered by the magnitude of litter, rowdyism, theft, vandalism and confrontations in remote areas. Some BLM

personnel and recreationists have been harrassed by belligerents. Some visitors have been physically harmed.

Compounding the problem are both wilful and inadvertent acts of destruction against the desert environment. Off-road motor vehicles are churning away soil and vegetation in fragile eco-systems. BLM efforts to manage off-road use by persuasion, education and cooperation are helpful. But a sizable number of people are not receptive to this approach.

There are man-made hazards such as traffic congestion and old mining shafts. And there still are natural hazards--great distances, heat and lack of water--waiting to take their toll. These hazards are causing injury and death to visitors.

The trends now developing are ominous. If they are not reversed, there will be severe losses in the form of destroyed resources and lost recreation opportunity. Some species of rare and endangered wildlife may become extinct.

The answers to many unsolved questions in anthropology, archaeology and paleontology may be never found because of destroyed artifacts, fossils and other remains.

Historic structures and remnants will be damaged and destroyed.

Litter will foul the scenery and cost many thousands of dollars annually for cleanup.

Indiscriminate off-road vehicle use will grow and environmental destruction will increase.

Vandalism and theft of federal property will destroy recreation benefits.

Maintenance and replacement costs may become prohibitive.

Harassment of visitors will continue and, perhaps, intensify as the lack of BLM enforcement authority becomes more widely known.

Serious injury and the number of deaths from natural and man-made hazards will escalate.

The Desert-- which has so much to offer--will become a massive slum, a place where most people will fear to venture.

A recent example illustrates one extremity of the situation. On Thanksgiving weekend last year, a band of thugs piled cross-ties on the Southern Pacific track and forced a train to stop. They threw rocks at another passing train, and an engineer was injured when a rock broke a windshield on his locomotive. A deputy and a railroad investigator who went to the scene were met by a fusilade of rocks and were forced to leave. No arrests could be made.

The Problem: II. BLM's Lack of Enforcement Authority

The Bureau of Land Management obviously must do all that it can to protect desert visitors and resources. But what the Bureau can do is miniscule compared to the need. Other federal agencies involved with recreation uses of federal lands have been provided by Congress with statutory authority to enact rules and regulations, the violation of which are petty offenses. These offenses can be processed through U.S. Magistrates' Courts. BLM does not have this statutory grant. In short, the Bureau cannot require the lawful use of most of the land it administers.

Legislation, enforcement personnel, operating funds, equipment, facilities, policy, organization, training, procedures and inventory--all these are lacking. Local law enforcement personnel provide assistance at times, but their manpower and funds sharply curtail their cooperative efforts.

BLM is responsible for the protection of its resources, facilities and personal property, but it has no enforcement authority. There are federal criminal statutes regarding theft, damage and destruction of federal property, arson and assault on a federal officer. These statutes generally are investigated by the FBI and enforced by the Federal courts.

BLM may investigate federal criminal statute violations if the FBI turns down BLM's request to investigate. The U. S. Attorney then decides whether to prosecute.

There are no federal criminal statutes applicable to BLM lands regarding murder, rape, assault, child molesting, robbery, burglary, auto theft, car clouts, theft, malicious mischief, riots, drunkeness, disturbing the

peace, panhandling, indecent exposure, nudism and other offenses between visitors to BLM land. There are, however, state criminal statutes governing such offenses against people, applicable to BLM land, where the United States has proprietary jurisdiction.

All public domain administered by BLM in California is included within this proprietary jurisdiction.

BLM, as a proprietor, is entitled to protection under state law, just as a private citizen. As a practical matter, however, the local sheriff must keep his limited forces close to the more densely populated areas where the majority of crime occurs. Only if his forces were increased would he be able to do otherwise.

Where willing, the sheriff may deputize a BLM employee as a peace officer, and the employee may accept such appointment. However, sheriffs in California require full training through their academy before deputization and this would require that BLM employees be given such training to be deputized.

A BLM employee who receives this training and subsequent deputization may enforce state law on federal land where there is federal proprietary jurisdiction. He may also cooperate with the sheriff to enforce state law on private land that is intermingled with and around BLM land--if such activity is reasonably necessary to protect BLM land.

In order for a BLM peace officer to function, he must have the full support of the sheriff, district attorney, local judges, the board of supervisors and the local citizenry. It is important to remember that the violators of state law on federal land are tried in state courts by state prosecutors and the guilty are sent to state jails and prisons.

Certain BLM rules and regulations dealing with illegal firearms, littering, fires, speeding in campgrounds, occupancy and other offenses could be covered by county ordinances and enforced by county officials. But the ability to get uniformity in such a series of ordinances, even in one state, is so remote that this method of enforcement appears impractical. A further drawback to this method would be the fiscal and personnel limitations placed upon local law enforcement agencies.

County ordinances are enforceable, even where no similar BLM rule or regulation exists, if such ordinances are not in conflict with Bureau programs, or with the rights of the public to use BLM land. As a practical matter, however, sheriff's deputies rarely get beyond the desert edge except during rescue operations or in response to some other special call.

The California Highway Patrol is primarily concerned with safe use of major highways in the desert and assistance to motorists. The patrolman is seldom available in the back country.

The California Division of Forestry enforces state fire laws and suppresses wildfires, but it has stations only along the western edge of the desert.

The California Department of Fish and Game wardens enforce state laws relating to the protection of fish and game.

In summary, on public lands administered by BLM, state law is generally applicable to offenses against persons, habitants, property, public health, safety, comfort and morals; and against public justice and authority. Certain federal statutes provide additional protections against offenses

such as wrongful cutting of government timber and destruction of antiquities.

The existing state and federal laws, however, are not geared to the volume and variety of offenses which now confront BLM in the California Desert.

The most glaring deficiency is the Bureau's lack of enforcement authority to carry out its own resource and public protection responsibilities on the public domain. Its only enforcement authority pertains to the collection of fees for campground use. Additionally the bureau has no trained cadre of people yet available to assume any enforcement responsibilities authorized or delegated.

There are no federal criminal statutes relating to littering, shooting, camping and building fires in unauthorized places; trespass without damage to property and other actions identified in general rules and regulations.

It should be noted that even if enforcement authority existed, most of BLM's recreation rules and regulations fail to give due notice as required by the U. S. Constitution. Correction of this deficiency would be subsequent to any legislation providing enforcement authority.

Although the Secretary of the Interior has the authority to enact rules and regulations, there is virtually no statutory authority applicable to BLM administered lands which provides for punishment of violations. The minor exception is enactment of special regulations under the Taylor Grazing Act to apply to areas within grazing districts.

Many of the areas of public domain which will be developed for recreation uses are not within the grazing districts. Placing these areas under the authority of the Taylor Grazing Act appears to be an inadequate and cumbersome approach to the law enforcement problem.

People use of the California Desert is growing rapidly. In view of the certain increase in law violations that will result and the limitations inherent in cooperating agencies, BLM urgently needs law enforcement authority and capability. Without this, the Bureau cannot adequately meet its responsibilities to protect visitors, resources and facilities. Such authority--and the nature of the enforcement organization--must come from new legislation.

The Solution: I. Legislation and Enforcement Alternatives

Authority for BLM to enforce public land rules and regulations would be granted by Section 5 of Senate Bill S.3389, introduced by Senator Jackson, September 4, 1970. A necessary adjunct to this provision--authorization to make arrests for violations of public land rules and regulations--is included in Section 6.

S.3389 passed the Senate but action was not taken by the House of Representatives in the 91st Congress. In addition, a bill, H.R. 17726, with similar enforcement authority was introduced in the House of Representatives in 1970 by Congressman Goldwater.

If enforcement legislation is passed, it will be necessary to provide a set of enforceable regulations which are tailored to needs of BLM in managing the public lands.

The type of recreation regulations now in effect for BLM are general in nature and tend to be advisory or educational, rather than those which could be strictly enforced. They are not stated in a way that gives proper notice and, therefore, due process, to persons who would be charged with violation. This omission undoubtedly is due to the fact that the regulations were not drafted with a view of enforcement with criminal law sanction.

Adequate protection of the public domain may require some combination of federal effort supplemented by state or local law enforcement. To be entirely certain of the legal right to assist local law enforcement financially, and to obtain more intensive protection, enactment of legislation which would permit contracting for such services is desirable.

A bill which sought to obtain such authority for the Forest Service, H.R. 16337, was introduced in 1970 by Congressman Sisk. This bill or a similar measure could be made applicable to BLM.

The desirability of statutory authority in this regard is that generally the United States may not pay for a service that it is entitled to receive in a proprietary capacity. If a greater amount of service were provided than a private individual would receive, it would appear that reimbursement would be proper, but there would always be gray areas. The Sisk bill is designed to eliminate this problem. Action was not taken on this bill in the 91st Congress.

The enactment of legislation to establish and fund a specific form of enforcement organization for BLM should follow an analysis of resource and visitor protection problems. The Bureau needs to initiate a reporting system and begin now to collect individual reports of criminal offenses. Such violations could not be cited for prosecution, but a courtesy citation system could be instituted.

Such a system would be handicapped by having only a few field people to observe and prepare recommended reports, but every effort must be made to gather hard data that will permit quantifying the need.

BLM's approach to law enforcement could follow the patterns of the two other principal federal services which are heavily involved in recreation.

National Park Service. In some areas, as Death Valley, the National Park Service has proprietary jurisdiction in which they have a cooperative law enforcement arrangement with local agencies. In other areas such as Yosemite National Park, the Service has exclusive jurisdiction and NPS is

the enforcement agency for those areas. In the latter case, local enforcement officers assist only when requested. The ranger can accept appointments as deputy sheriff, town or township peace officer and state fish and game officer to operate under state law. He can make arrests and is authorized to carry firearms as a means of personal protection as well as an aid in enforcement. The NPS ranger is uniformed and highly trained in law enforcement procedure. In addition, his duties include traffic management, fire control, visitor protection, natural resource management, rescue, inspection of public facilities and safety.

Forest Service. The Forest Service relies on designated forest service officers who are uniformed and trained to enforce rule and regulation violations without weapons and short of offensive action. Though arrest authority is available, administratively it is not applied. Violators are cited before U.S. magistrates. Local law enforcement officers are relied upon to enforce state and local laws and ordinances. Local enforcement agencies are called upon to make forcible arrests and for offensive actions, such as confrontation with group violations.

When the Forest Service requires federal action, the services of the U.S. marshals, FBI or other federal enforcement officers are requested. The Forest Service ranger may take defensive action to protect the life or safety of forest users or FS personnel, but the approach is primarily for safety rather than enforcement.

The availability of local law enforcement officers to assist the Forest Service is comparable to that experienced by BLM. The local officers seldom can take time to travel to remote areas as trailheads and campgrounds. They can do little more about crimes committed in such areas than to record information well after the fact.

The Solution: II. Proposed Protection

Considering the Bureau's proprietary jurisdiction, responsibilities, lack of enforcement authority and present limited capability, it is believed the course to be taken should follow principles of both the National Park Service and Forest Service enforcement policies.

The most important BLM need is legislated authority to enforce its rules and regulations. Enactment of a bill like the Jackson Bill, S.3389, would grant BLM rule and regulation enforcement authority and would parallel that of the Forest Service and National Park Service.

Besides being able to enforce its rules and regulations BLM needs extra state and local law enforcement protection on public domain in the desert away from populated areas but lacks authority to pay for it. Legislation enacted such as the Sisk Bill H.R. 16337, with BLM included, would provide law enforcement contracting authority.

While waiting for such legislative actions, BLM would develop an enforcement awareness and a technical capability in its protection-enforcement employees through training and on-the-ground observation. After legislation, the Bureau would develop a force which can protect resources and the public through citation authority, together with such arrest authority as is determined feasible. When appropriate and necessary, BLM capability would be reinforced with in-lieu payments to counties for additional local enforcement, if legislation such as the Sisk bill is enacted.

The Desert Ranger Unit

Pending enforcement authority and capability, carefully selected permanent Bureau resource management employees interested in protection-law enforcement work would be reassigned to the desert and would be referred to as rangers. Some rangers would be hired from outside the BLM. Ranger desert assignments under an Area Manager would include management activities controlling off-road vehicle use and resource management work such as that performed by the range conservationist, engineer, wildlife specialist, and so on, as well as resource and visitor protection services. Protection services would be provided whenever needed in the desert. Besides travel to accomplish routine work, rangers would run regular safety patrols. Their vehicles would be clearly identified with the Bureau and specially equipped so rangers could give emergency help to the public.

Before enactment of enabling enforcement legislation, rangers generally would not be appointed peace officers nor delegated state law enforcement authority on public domain. A ranger would be more of a roving ambassador than lawman. He would provide liaison with local law enforcement forces which would handle the crime situations against persons.

The ranger would systematically gather information on the incidence of crime involving offenses against persons and resources. Hazards would be identified. He would acquaint himself with his area of responsibility so that he could interpret its historical, physical and other interesting

attributes to the visitor. He would go out of his way to educate and inform visitors about the Bureau's management programs and rules-of-the-road in his area. Observation, interpretation, guide service, information, education, liaison, emergency assistance, and perhaps, arbitration in conflicts, would come in the scope of his protection services.

With experience, BLM would provide the ranger policy and guidance on such matters as uniform, training, ranger qualifications and duties, chain of command, records, reports, possible use of defensive weapons, hazardous duty classification, career ladder, pay scale and specialized equipment. BLM would define ranger employment where appointment as deputy sheriff is required and where standards are set for coordination and cooperation with federal, state and local law enforcement agencies.

To develop enforcement awareness and technical capability, the ranger would receive 400 hours of intensive law enforcement training during his initial assignment. The training would be of the type offered by the Central Valley Peace Officers Training School at Modesto, California, certified by the State of California Commission on Peace Officer Standards and Training; and specialized training from the Federal Bureau of Narcotics and Dangerous Drugs.

Some rangers might also be trained at the National Park Service Grand Canyon Center. A National Law Enforcement Academy to be operated by the Treasury Department is to open in 1973 and could provide additional training. Because of the close cooperation between BLM and local officials, however, it would appear desirable to have most of the training provided locally. Such localized training would enhance liaison between

the BLM and the local groups of law enforcement officers.

Five natural resource specialists (rangers) would be hired the first year (FY 1972). The contemplated initial buildup would be 50 by the end of five years -- the schedule for implementation of a ranger unit in the desert.

First year costs include:

1.	Five specialists (GS-9) salary, travel, per diem		$85,000
2.	Communication equipment (four units)		3,000
3.	Training		
	a. Specialist training at academy	$10,000	
	b. Other district staff, awareness and enforcement training	10,000	20,000
			$108,000

After legislation and analysis of protection alternatives with the assistance of consultants and the public, a BLM resource and visitor protection system will evolve. The resource oriented ranger approach presented in this report provides critical needs protection now and leads into a future BLM protection system staffed at the different BLM organizational levels and blended with other federal, state and local law enforcement systems.

Conclusion

The California Desert, within easy reach of 10 million people in the Los Angeles area, is being subjected to trends that will be harmful to users and ruinous to resources and the high potential of the desert to serve an even greater population. The trends, now well established, are inadvertent misuse and deliberate abuse. A public affairs program

will be employed to stop most of the inadvertent misuse -- and an overwhelming majority of the public will respond to this in a positive way. In contrast, there are thousands who commit deliberate acts of vandalism against property and crimes against other visitors. No amount of persuasion and explanation will deter their anti-social acts. This trend, if allowed to continue, would result in incalculable losses to the public.

The traditional resource manager does not have the authority, the training or the numbers needed to deal with the lawless element. Local law enforcement agencies are too thinly manned to assist except in extreme cases. The Bureau of Land Management must assume the added role of protecting resources and people against criminal acts, in cooperation with local agencies, as is done by the Forest Service and the National Park Service. Legislation and capability to authorize and implement this new role is urgently needed.

Aldo Leopold said: "We abuse land because we regard it as a commodity belonging to us. When we see land as a community to which we belong, we may begin to use it with love and respect." It is the BLM's objective to use public education -- and law enforcement, where necessary -- to assure considerate use of the public domain.

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